



Zootaxa 2398: 1–65 (2010)

www.mapress.com/zootaxa/

Copyright © 2010 · Magnolia Press

Monograph

ISSN 1175-5326 (print edition)

ZOOTAXA

ISSN 1175-5334 (online edition)

ZOOTAXA

2398

New genera, species and host plant records of Nearctic and Neotropical Tephritidae (Diptera)

ALLEN L. NORRBOM¹, BRUCE D. SUTTON², GARY J. STECK² & JOSÉ MONZÓN³

¹*Systematic Entomology Laboratory, USDA, ARS, c/o Smithsonian Institution, P.O. Box 37012, MRC 168, Washington, DC 20013-7012, USA; email: allen.norrbom@ars.usda.gov*

²*Florida Department of Agriculture & Consumer Services, P.O. Box 147100, Gainesville, FL 32614-7100, USA; e-mail: suttonb@doacs.state.fl.us, steckg@doacs.state.fl.us*

³*Laboratorio de Entomología Sistemática, Universidad del Valle de Guatemala, Apartado Postal 82, 01901 Guatemala, Guatemala; e-mail: dynastes@intelnnett.com*



Magnolia Press
Auckland, New Zealand

Accepted by D. Bickel: 21 Jan. 2010; published: 12 Mar. 2010

ALLEN L. NORRBOM, BRUCE D. SUTTON, GARY J. STECK & JOSÉ MONZÓN
New genera, species and host plant records of Nearctic and Neotropical Tephritidae (Diptera)
(*Zootaxa* 2398)

65 pp.; 30 cm.

12 March 2010

ISBN 978-1-86977-487-5 (paperback)

ISBN 978-1-86977-488-2 (Online edition)

FIRST PUBLISHED IN 2010 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: zootaxa@mapress.com

<http://www.mapress.com/zootaxa/>

© 2010 Magnolia Press

All rights reserved.

No part of this publication may be reproduced, stored, transmitted or disseminated, in any form, or by any means, without prior written permission from the publisher, to whom all requests to reproduce copyright material should be directed in writing.

This authorization does not extend to any other kind of copying, by any means, in any form, and for any purpose other than private research use.

ISSN 1175-5326 (Print edition)

ISSN 1175-5334 (Online edition)

Table of contents

Abstract	3
Introduction	4
Materials and Methods	4
<i>Acidogona</i> Loew	5
Key to species of <i>Acidogona</i>	5
<i>Acidogona melanura</i> (Loew)	6
<i>Acidogona stecki</i> Norrbom, new species	6
<i>Acinia picturata</i> (Snow)	10
<i>Acrotaenia otopappi</i> (Doane)	11
<i>Agallamyia</i> Norrbom, new genus	12
<i>Agallamyia pendula</i> Norrbom, new species	14
<i>Dictyotrypeta crenulata</i> (Wulp), new combination	18
<i>Dictyotrypeta incisa</i> (Wulp), new combination	20
<i>Dioxyna crockeri</i> (Curran), new combination	20
<i>Dracontomyia</i> Becker	21
<i>Dracontomyia footei</i> Aczél	22
<i>Dyseuaresta mexicana</i> (Wiedemann)	22
<i>Euarestoides dreisbachi</i> Foote	23
<i>Homoeothrix aberrans</i> (Schiner), new combination	24
<i>Lamproxynella</i> Hering	24
<i>Neosphaeniscus</i> Norrbom, new genus	24
<i>Oedicarena beameri</i> Norrbom & Ming	28
<i>Oedicarena latifrons</i> (Wulp)	28
<i>Ostracocoelia mirabilis</i> Giglio-Tos	28
<i>Paracantha</i> Coquillett	29
<i>Paracantha trinotata</i> (Foote), new combination	33
<i>Phacelochaeta</i> Norrbom, new genus	33
Key to species of <i>Phacelochaeta</i>	34
<i>Phacelochaeta obliqua</i> Norrbom, new species	35
<i>Phacelochaeta quinquefasciata</i> (Hendel), new combination	37
<i>Phacelochaeta quinquevittata</i> (Norrbom), new combination	39
<i>Plaumannimyia</i> Hering	42
<i>Plaumannimyia eugenia</i> (Wulp), new combination	42
<i>Procecidochares atra</i> (Loew)	43
<i>Procecidochares suttoni</i> Norrbom, new species	44
<i>Pyrgotoides</i> Curran	50
<i>Rachiptera</i> Bigot	50
<i>Rachiptera parallela</i> (Hendel), new combination	52
<i>Rhagoletis</i> Loew	52
<i>Rhagoletis fuscobasalis</i> (Hering), new combination	53
<i>Rhynencina spilogaster</i> (Steyskal)	53
<i>Stenopa</i> Loew	55
Key to species of <i>Stenopa</i>	57
<i>Stenopa affinis</i> Quisenberry	57
<i>Stenopa mexicana</i> Norrbom, new species	57
<i>Stenopa vulnerata</i> (Loew)	58
<i>Tomoplagia stonei</i> Aczél	59
<i>Trupanea pseudovicina</i> Hering	59
<i>Xanthaciura insecta</i> (Loew)	60
Acknowledgments	66
References	63

Abstract

Three new genera and five new species of Tephritidae (Diptera) are described from the Nearctic and Neotropical Regions. The new genera are: *Agallamyia* Norrbom (type species: *A. pendula* Norrbom, n. sp.), *Neosphaeniscus* Norrbom (type species: *Euribia m-nigrum* Hendel), and *Phacelochaeta* Norrbom (type species: *Procecidochares quinquefasciata* Hendel). The new species include: *Acidogona stecki* Norrbom (Guatemala, Mexico: Chiapas), *Agallamyia pendula* Norrbom (Guatemala), *Phacelochaeta obliqua* Norrbom (Ecuador), *Procecidochares suttoni* Norrbom (Guatemala), *Stenopa mexicana* Norrbom (Mexico). Five new generic synonyms are proposed: *Cecidocharella* Hendel, 1936 =

Dracontomyia Becker, 1919; *Gerrhoceras* Hering, 1942 = *Pyrgotoides* Curran, 1934; *Stoneola* Hering, 1941 = *Rhagoletis* Loew, 1862; *Strobelia* Rondani, 1868 = *Rachiptera* Bigot, 1859; and *Xenochaeta* Snow, 1894 = *Acidogona* Loew, 1873. The following 41 new combinations are proposed: *Acidogona dichromata* (Snow), *Dictyotrypeta crenulata* (Wulp), *D. incisa* (Wulp), *Dioxya crockeri* (Curran), *Dracontomyia tucumana* (Aczél), *D. borrichia* (Bush & Huettel), and *D. elegans* (Hendel), *Homoeothrix aberrans* (Schiner), *Neosphaeniscus m-nigrum* (Hendel) and *N. flexuosus* (Bigot), *Paracantha trinotata* (Foote), *Phacelochaeta quinquefasciata* (Hendel) and *P. quinquevittata* (Norrbon), *Plau-mannimyia ameghinoi* (Brèthes), *P. coelestina* (Hering), *P. delicatella* (Blanchard), *P. difficilis* (Malloch), *P. dolores* (Hering), *P. eugenia* (Wulp), *P. flava* (Adams), *P. hestiae* (Hendel), *P. imitatrix* (Hering), *P. miseta* (Hering), *P. plagiata* (Blanchard), *P. scutellata* (Séguy), *P. setulosa* (Malloch), *P. subaster* (Malloch), *P. suspecta* (Malloch), *P. thomsoni* (Hendel), *P. titschacki* (Hering), and *P. valdesiana* (Gandolfo & Norrbom), *Pyrgotoides paradoxus* (Hering) and *P. peruvianus* (Korytkowski), *Rachiptera alboguttata* (Hendel), *R. baccharidis* (Rondani), *R. bimaculata* (Hendel), *R. ferruginea* (Hendel), *R. lutulenta* (Hendel), *R. parallela* (Hendel), and *R. rubiginosa* (Rondani), and *Rhagoletis fusco-basalis* (Hering). A lectotype is designated for *R. fuscobasalis*. New distribution and host plant records also are reported.

Key words: Diptera, Tephritidae, Tephritinae, taxonomy, host plant, Asteraceae

Introduction

The Tephritidae chapter in the forthcoming *Manual of Central American Diptera* will include a new key to the Neotropical genera and a synopsis of the genera occurring in Central America and southern Mexico. Research for that chapter resulted in the recognition of several new genera and new generic synonymies, which are published here to be available for the Manual. Various new species are also described, new combinations are proposed, and new host plant records are also published so that these data may be included in the Manual chapter. Many of the new distribution and host records are from recent collecting efforts in Guatemala, whose tephritid fauna, except for the genus *Anastrepha*, is relatively poorly known compared to those of Mexico and Costa Rica.

Materials and Methods

Label data for all examined specimens will be made available in the New World fruit fly specimen database on the Systematic Entomology Laboratory web site (www.sel.barc.usda.gov:591/diptera/Tephritidae/TephIntro.html). A USNM barcode label was added to most specimens that previously lacked a barcode label. These labels do not indicate ownership, they are unique specimen identifier numbers. In the Type data and Specimen examined sections the barcode number is listed following the depository acronym for each specimen or series. Acronyms for the institutions where specimens are deposited are: AMNH—American Museum of Natural History, New York; BMNH—Natural History Museum, London; CAS—California Academy of Sciences San Francisco; CDFA—California Department of Food & Agriculture, Sacramento; CNC—Canadian National Collection, Ottawa; CUI—Cornell University, Ithaca; DEBUG—Department of Environmental Biology, University of Guelph; FSCA—Florida State Collection of Arthropods, Gainesville; IEXV—Instituto de Ecología, Xalapa; IML—Instituto Miguel Lillo, Tucumán; IMZ—Istituto e Museo di Zoologia, Turin; MCZ—Museum of Comparative Zoology, Harvard University, Cambridge; MHNG—Muséum d'Histoire Naturelle, Geneva; MNHNP—Muséum National d'Histoire Naturelle, Paris; MSUL—Michigan State University, East Lansing; MZUSP—Museu de Zoologia, Universidade de São Paulo; NMW—Naturhistorisches Museum, Vienna; PAN—Polish Academy of Sciences, Warsaw; SDNHM—San Diego Natural History Museum, San Diego; SMT—Staatliches Museum für Tierkunde, Dresden; TAMU—Texas A&M University, College Station; TAU—Tel Aviv University; UAT—University of Arizona, Tucson; UCB—University of California, Berkeley; UCD—Bohart Museum, University of California, Davis; UCRSJ—Universidad de Costa Rica, San José; UKaL—Snow Museum, University of Kansas, Lawrence; USNM—National Museum of Natural History, Smithsonian Institution, Washington, DC; USU—Utah State University, Logan; UVG—Universidad del Valle de Guatemala; ZIL—Zoological Institute, Lund.

Morphological terminology follows White *et al.* (1999). The world Tephritidae were databased by Norrbom *et al.* (1999) and Norrbom (2004), including original combinations, citations, type data, and references, and Foote *et al.* (1993) provided detailed synonymies for the species in the United States and Canada. This information therefore is not repeated here for all included taxa and cited references.

The taxonomic decisions in this paper were the responsibility of Norrbom. All of the authors contributed to the field studies in Guatemala. Photos of the Guatemalan host plants were taken by Steck and Monzón. Most of the exotic reared specimens cited in this paper, including all of the Guatemalan specimens reared by Norrbom, emerged from puparia in the USNM quarantine area under laboratory conditions, thus their emergence times may differ from flies in nature.

Acidogona Loew

Acidogona Loew 1873: 285 (type species *Trypeta melanura* Loew, by monotypy).

Xenochaeta Snow 1894: 166 (type species *X. dichromata* Snow, by monotypy). **New synonymy.**

Xenochaeta Snow is here considered a junior synonym of *Acidogona* Loew, and *A. dichromata* (Snow), **new combination**, is transferred to the latter genus. The characters previously used to distinguish *Xenochaeta* and *Acidogona*, which are both monotypic, intergrade or are variously shared with *A. stecki*, a new species from Mesoamerica, so that the latter cannot be easily placed in either taxon.

The key of Foote *et al.* (1993, couplet 34) separates *Acidogona* from *Xenochaeta* (in which *X. aurantiaca* (Doane), now considered a synonym of *A. dichromata* (Goeden & Teerink 1997), also was recognized), based on the size of the first flagellomere, which is indicated to be longer than 2/3 the eye height in *Acidogona*, but less than half as long as the eye height in *Xenochaeta*. There is a distinct difference in first flagellomere relative size between females of *A. melanura* and *A. dichromata*, but not between males. It is larger in females of all three species than in males, and in *A. stecki* females is intermediate in size between the former two species. Measured on the mesal side, the first flagellomere is 0.53–0.61 times as long as the eye height in females (n=4) and 0.33–0.35 in males (n=3) of *A. melanura*, 0.49–0.53 in females (n=4) and 0.37–0.39 in males (n=3) of *A. stecki*, and 0.38–0.43 (n=5) in females and 0.31–0.34 (n=3) in males of *A. dichromata*. Foote *et al.* (1993: 490) also distinguish these two genera by “the very different type of wing pattern”, and the much smaller size of *Xenochaeta* species. Although the wing pattern in *A. melanura* is not sexually dimorphic, it is dimorphic in *A. stecki*, as in *A. dichromata*, and the patterns of the males of the latter two species are similar. In females the wing pattern differs among the species but the homology of the elements of the patterns can be recognized. In *A. dichromata* the hyaline spots are smaller and more numerous, but are arranged similarly to both sexes of *A. melanura*, whereas in *A. stecki* many of the spots are fused to form a more banded pattern. In size, all three species broadly overlap. Korneyev (1999) indicated differences in the degree of acuteness of the first flagellomere and the color, size and orientation of the scutellar setulae between these two genera, but based on a broader range of examined material there are no significant differences in these characters. In all three species the apex of the first flagellomere varies similarly, and it is always distinctly acute. Specimens of *A. dichromata* from California have more of the scutal setulae brown and acuminate, but in northern specimens most of these setulae are white and lanceolate, similar to *A. melanura*. A better character that consistently separates both sexes of *A. dichromata* from the other two species is that in *A. melanura* and *A. stecki* the scutellum is lightly microtrichose, whereas it is bare and shiny in *A. dichromata*. Given the intergradation in other characters, however, the difference in this character alone does not justify the continued recognition of *Xenochaeta* as a separate genus.

All three species of *Acidogona* breed in flowers of *Hieracium* species (Asteraceae: Cichorieae) (Foote *et al.* 1993, Goeden & Teerink 1997).

Key to species of *Acidogona*

1. Scutellum entirely microtrichose. Wing of female (Figs. 30–31, Foote *et al.* 1993, fig. 110) with hyaline spots relatively large, spot at apex of vein R_{2+3} usually extending to posterior half of cell r_{2+3} , cell r_{4+5} with at most 3 hyaline spots distal to crossvein dm-cu. If wing of male without hyaline marks in cell dm (Fig. 32), male abdominal tergites 3–5 without brown markings 2

- Scutellum nonmicrotrichose except sometimes on lateral and apical margins. Wing of female (Foote et al. 1993, fig. 528) with hyaline spots relatively small, spot at apex of vein R_{2+3} not extending to posterior half of cell r_{2+3} , cell r_{4+5} with at least 4 small hyaline spots distal to crossvein dm-cu. Wing of male (Foote et al. 1993, fig. 529) without hyaline marks in cell dm. Male abdominal tergites 3–5 with 2 pairs of dark brown spots. Western Canada & USA *dichromata* (Snow)
- 2. Wing of female (Foote et al. 1993, fig. 110) with separate hyaline spots medially in cells br, dm and cu₁ and distally in cells r_{2+3} , r_{4+5} and m; marginal hyaline marks in cell r_1 often not extending to vein R_{4+5} ; and pterostigma usually with subapical yellowish to hyaline spot. Wing of male with hyaline spots in cell dm. Male abdomen with at least 1 pair of brown spots on tergites 3–5. Eastern Canada & USA..... *melanura* (Loew)
- Wing of female (Figs. 30–31) with hyaline band from cell br to posterior wing margin in cell cu₁ and oblique subapical hyaline band across most of cells r_{4+5} and m, sometimes fusing with marginal spot in cell r_{2+3} ; marginal hyaline marks in cell r_1 both large, extending to vein R_{4+5} ; and pterostigma entirely brown. Wing of male (Fig. 32) without hyaline marks in cell dm. Male abdomen at most with pair of brown spots on syntergite 1+2. Southern Mexico (Chiapas), Guatemala..... *stecki* Norrbom, n. sp.

Acidogona melanura (Loew)

Distribution. The following are new records or indicate the basis for some of the distribution points on map 1 of Foote *et al.* (1993) or the range listed for this species by Norrbom *et al.* (1999). The records from Alabama and Oklahoma extended the known distribution of this species considerably westward. Those from Georgia and New York are the first records from those states. The locality in Quebec (the site of Frank McAlpine's cottage) is north of Ottawa (Jeff Cumming, pers. comm.), not opposite James Bay as indicated on the Foote *et al.* map, thus this species is not known to occur so far to the north as is indicated on the map. The outlying distribution points for *Euaresta bella* (Loew) (map 14), *Jamesomyia geminata* (Loew) (map 31), and *Paramyiolia nigricornis* (Doane) (map 32) are also based on misplotted dots for this locality.

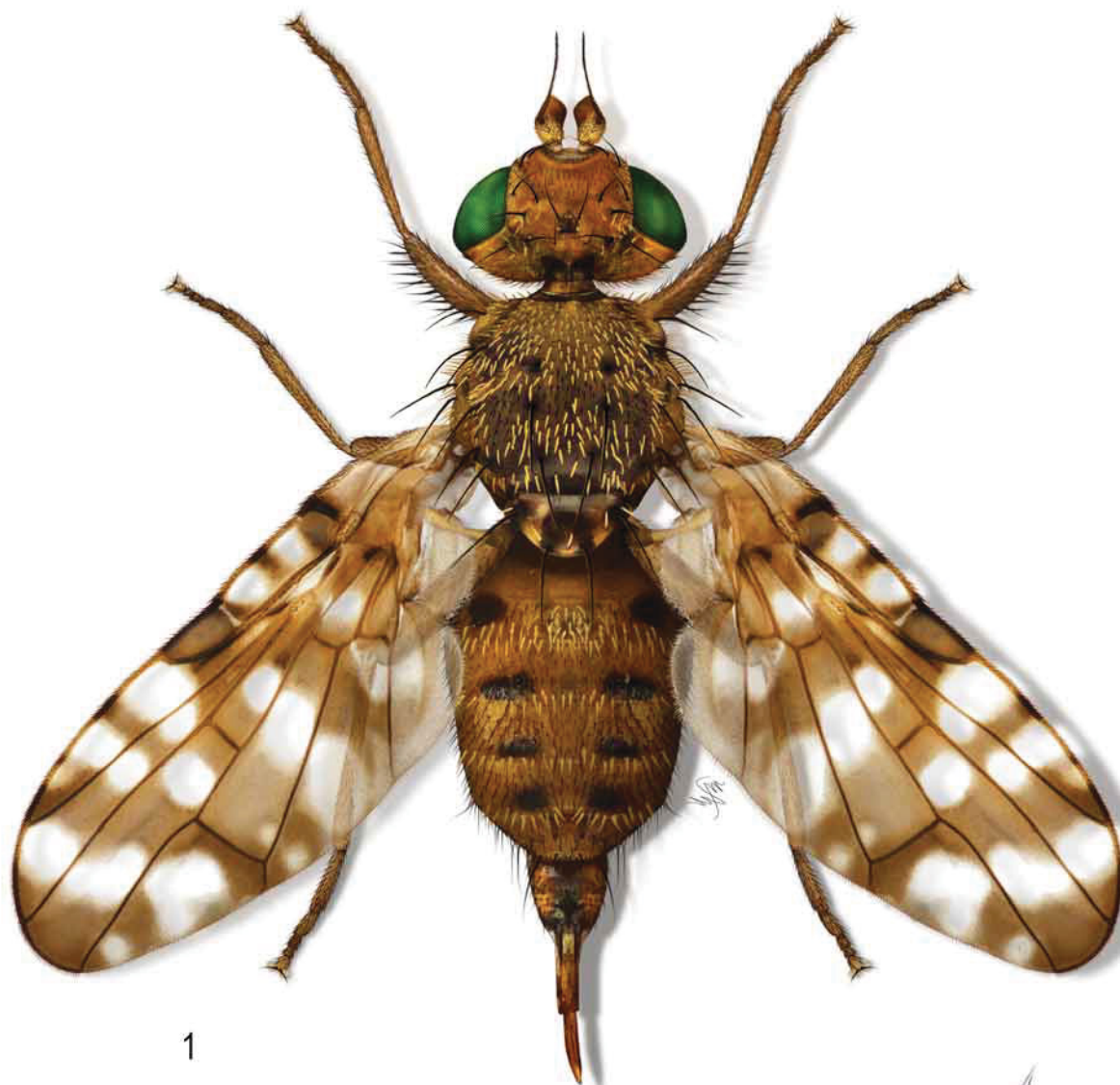
A single very teneral male from Chihuahua (AMNH collection), the only specimen of *Acidogona* known from northern Mexico, is similar to *A. melanura*, but its identity remains uncertain.

Material examined. CANADA: Quebec: Duncan Lake, nr. Rupert [45°41'N 75°59'W], 1 Aug 1969, J. F. McAlpine, 1♀ (CNC). UNITED STATES: Alabama: Mobile Co., Kushla, 7–19 Oct 1922, A. H. Sturtevant, 1♀ (USNM USNMENT00212920). Georgia: Midway, 14 Jun 1954, D. L. Haynes, 1♀ (USNM USNMENT00212923). New York: Long Island, Cold Spring Harbor, 14 Jul 1927, A. L. Melander, 1♀ (USNM USNMENT00212919). Oklahoma: Latimer Co., [unspecified locality], Jun 1986, K. Stephan, 1♀ (FSCA USNMENT00212922); same, Jun 1987, 1♀ (FSCA USNMENT00212921).

Acidogona stecki Norrbom, new species

Figs. 1–10, 30–32

Diagnosis. This species differs from *A. dichromata* by its entirely microtrichose scutellum and slightly larger first flagellomere. It differs from both *A. dichromata* and *A. melanura* in wing pattern. In the female the pattern is more banded, with fewer hyaline spots. In particular there is a hyaline band from cell br to the posterior wing margin in cell cu₁ and an oblique subapical hyaline band across most of cells r_{4+5} and m, sometimes fusing with the marginal spot in cell r_{2+3} and extending anteriorly to the apex of vein R_{2+3} . The marginal hyaline marks in cell r_1 both extend to vein R_{4+5} , whereas they usually do not in *A. melanura* and never do so in *A. dichromata*. The pterostigma and apical part of r_1 are entirely brown, both lacking the subapical yellowish to hyaline spot commonly present in *A. dichromata* and *A. melanura*. The wing pattern is strongly sexually dimorphic as in *A. dichromata* and the pattern in the male resembles that species (e.g., cell dm entirely infuscated), but is more diffuse, with less contrast between the pale and dark parts of the pattern. It differs from both *A. dichromata* and *A. melanura* in lacking a subapical hyaline spot in cell br, and the subbasal spot in cell r_{4+5} is faint or absent. Males also have less dark brown abdominal markings than in *A. dichromata* and *A. melanura*, at most with 1 pair of spots on syntergite 1+2.



1

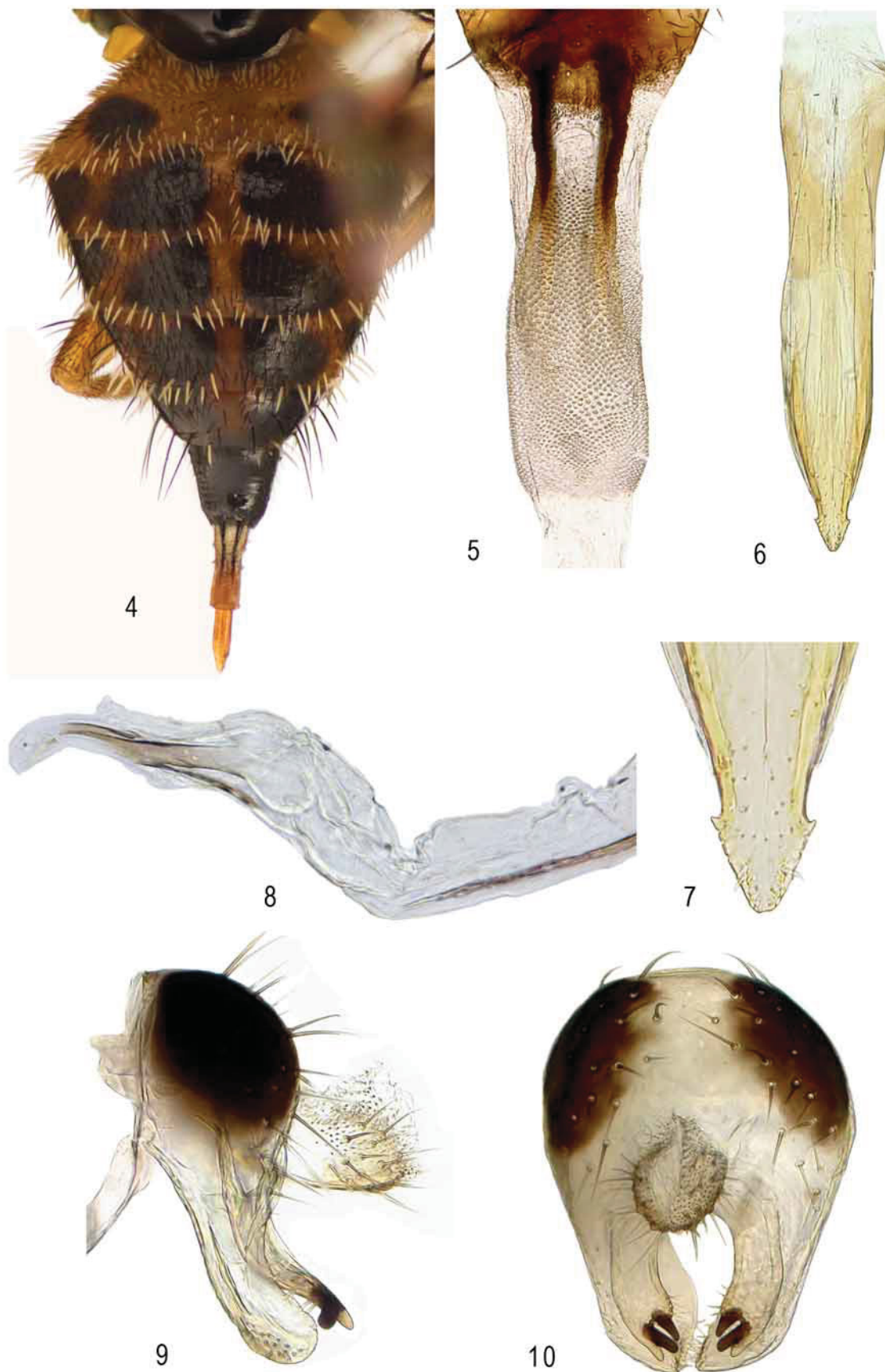


2



3

FIGURES 1–3. *Acidogona stecki* (Guatemala: N of San Lorenzo): 1, female habitus, dorsal (USNMENT00671092); 2, female head, lateral (USNMENT00104211); 3, male head, lateral (USNMENT00671094).



FIGURES 4–10. *Acidogona stecki* (Guatemala: N of San Lorenzo): 4, female abdomen, dorsal (USNMENT00671091); 5, eversible membrane, ventral (USNMENT00671092); 6, aculeus, ventral (USNMENT00671092); 7, aculeus tip, ventral (USNMENT00671092); 8, glans, lateral (USNMENT00671085); 9–10, epandrium and surstyli, lateral and posterior (USNMENT00671085).

Description. Small to moderate sized, body length 3.0–4.5 mm. Mesonotum length 1.32–1.92 mm. Wing length 3.2–4.4 mm, width 1.2–1.8, ratio 2.30–2.62.

Head (Figs. 2–3): Yellow except ocellar tubercle and most of occiput dark brown; parafacial occasionally (4 of 13 specimens) with small, faint brown spot aligned with base of antenna. Entirely microtrichose; most setae and setulae dark red brown to black, acuminate. Frons broad, 2.1–2.7 times as broad as width of eye; with numerous fine, black setulae medially and surrounding frontal and orbital setae; 3 frontal setae, anterior 2 closer together, 2 orbital setae, both reclinate; ocellar seta well developed, postocellar seta ca. half as long as ocellar seta; medial vertical seta black, acuminate; facial ridge setulae fine, yellow; genal setulae mostly brown, genal seta brown or yellow; postocular setae mostly yellow, lanceolate, 1–3 sometimes smaller, black, acuminate; setulae of occiput and postgena yellow, lanceolate. Face without medial carina; lunule narrow. Eye large, genal height 0.22–0.26 times eye height. Antennal first flagellomere 1.58–1.93 times as long as wide, 0.37–0.39 times eye height in male, 0.49–0.53 times eye height in female; arista entirely minutely pubescent, more sparsely on distal half. Proboscis large, capitate; palpus broad, oval, with brown and yellow setulae.

Thorax (Fig. 1): Microtrichose except extreme anteromedial margin of scutum (not visible in dorsal view) and medially on mediotergite; scutum and scutellum entirely microtrichose. Scutum mostly dark brown, appearing tan due to microtrichia, with paired circular dark brown spots at mesal end of transverse suture and surrounding bases of dorsocentral, acrostichal, intra-alar, and supra-alar setae. Postpronotal lobe, posterior part of notopleuron, and small posterolateral area of scutum yellow. Scutellum color variable, sometimes mostly yellow with dark brown spots at bases of setae and often with fifth spot basomedially; sometimes mostly brown, with apical spots connected to basomedial spot and/or to basolateral spots isolating 1–2 paired yellow spots and apical medial spot. Pleuron mostly brown; at least anteroventral half of propleuron, anterior, dorsal, and posterior margins of anepisternum, dorsomedial spot on katapisternum, and katapimeron yellow. Subscutellum and mediotergite dark brown. Following setae well developed, dark red brown to black, acuminate: postpronotal, anterior notopleural, presutural and postsutural supra-alar, intra-alar, postalar, dorsocentral (aligned with or very slightly posterior to postsutural supra-alar seta), acrostichal, and 2 scutellar setae. Posterior notopleural seta short, yellowish, lanceolate; 2–4 brown, acuminate and 2–3 yellowish, lanceolate anepisternal setae; anepimeral seta yellowish, acuminate in male, usually brown (5 of 7 specimens checked) in female; katapisternal seta well developed, yellowish, acuminate. Scutal setulae mostly yellowish, lanceolate; at least a few setulae between and posterior to dorsocentral and postsutural supra-alar setae black, acuminate, usually connected in shallow, inverted V-shaped band across scutum medially aligned with or anterior to dorsocentral seta. Scutellum moderately convex, nonsetulose medially, margin with yellow, lanceolate setulae, at least 1–2 basal to basal seta, usually 1–2 between basal and apical setae, and often with 1–2 setulae between apical setae. Pleural setulae yellow, lanceolate; in single vertical row on propleuron, on posterodorsal half of anepisternum, on katapisternum except anteriorly and on posterior margin, and on anepimeron surrounding anepimeral seta, up to 2/3 as long as seta.

Legs: Entirely yellow. Hind femur with anterodorsal and posterodorsal preapical setae.

Wing (Figs. 30–32): Pterostigma 0.51–0.58 times length of cell c. Lobe of cell bcu short, 0.20–0.25 times as long as width of cell. Crossvein r-m at 0.61–0.66 distance from bm-cu to dm-cu on vein M. Vein R_1 dorsally without gap in setulae near bend in vein Sc. Vein R_{4+5} dorsally with 2–5 setulae basally. Pattern sexually dimorphic. In female (Figs. 30–31) predominantly pale to moderate brown with hyaline spots, some fused to form bands. Cell c with 2 large quadrate hyaline spots, both extended to anterior and posterior margins and broader than medial brown mark; in 1 female hyaline except basally and apically, without medial brown mark. Pterostigma entirely brown. Cell r_1 with only 2 marginal hyaline marks, both large, extending to vein R_{4+5} , proximal mark ending slightly distal to crossvein r-m. Cell r_{2+3} with subapical marginal hyaline spot, narrowly separated from (3 Guatemalan females) or partially fused with medial spot in cell r_{4+5} and proximal mark in cell m to form oblique band. Cell r_{4+5} also with large subbasal hyaline spot and sometimes with 1–2 small subapical spots. Cell m with medial hyaline spot, sometimes fused to oblique band, and small subapical spot. Cell br with large subapical hyaline spot, fused with large subbasal spot in cell dm and large medial spot in cell cu_1 to form band. Cell dm sometimes with small anterior subapical hyaline spot (Chiapas female) or posterior subapical hyaline spot (3 Guatemalan females). Cell bm with large medial spot. Cell cu_1 with basal hyaline spot, aligned with similar spot in anal lobe; often with small subapical spot. In male (Fig. 32) pattern more diffuse, hyaline areas less sharply defined. Cell c hyaline except narrow basal and apical brown areas, and usu-

ally also with small anterior medial brown mark. Cell r_1 with 2 marginal hyaline marks, both extending to or almost to vein R_{4+5} . Cell r_{2+3} with isolated subapical marginal hyaline spot. Cell r_{4+5} usually with small diffuse subbasal hyaline spot (absent in 1 specimen) and 1–2 small subapical spots. Cell m with diffuse, subhyaline triangular marginal area. Cell cu_1 with large diffuse, irregular, subhyaline area medially.

Abdomen (Figs. 1, 4): In Guatemalan males entirely yellow (1 specimen) or only with 1 paired sublateral brown spot on syntergite 1+2. In most Guatemalan females (Fig. 1) yellow with 1 paired sublateral brown spot on syntergite 1+2 and with 1 usually broader paired submedial brown spot on tergites 3–5 and sometimes tergite 6; in 1 Guatemalan female (Fig. 4) with additional row of sublateral brown spots (more lateral than on syntergite 1+2) on tergites 3–5; in Chiapas female syntergite 1+2 yellow with sublateral brown spots, other tergites mostly brown with narrow, irregular medial yellow area. Entirely sparsely microtrichose except in male to varying extent laterally on tergite 5 and in female on oviscapae, most of tergite 6, and narrowly laterally on tergite 5. Setulae mixed black acuminate and white lanceolate; mostly white on syntergite 1+2 except medial to subapical band of black setulae; mostly black on other tergites except mostly white on posterior margins of tergites 3–4 of male and 3–5 of female.

Male terminalia (Figs. 8–10): Epandrium yellow with posterolateral dark brown spot. Surstyli moderately elongate; lateral surstylus gradually posteriorly curved, blunt apically; medial surstylus as long as and well separated from lateral surstylus, more sharply posteriorly curved, with 2 subapical prenisetae. Glans (Fig. 8) small, weakly sclerotized except for single tubelike sclerite.

Female terminalia: Oviscapae (measured ventrally from apex of basal medial desclerotized area, which is elongate and slender) 0.60–0.75 mm long, 0.38–0.41 times as long as mesonotum; color variable, often orange except apicoventrally, basodorsally and apicodorsally, frequently with dorsal brown areas connected by medial vitta, in 1 Guatemalan female and Chiapas female entirely dark brown; setulae entirely black acuminate. Eversible membrane (Fig. 5) with pair of taenia dorsally and ventrally. Aculeus (Fig. 6) 0.60–0.62 mm long, ca. 5.5 times as long as wide, tapering on distal fourth to sagittate tip (Fig. 7). 2 spermathecae subspherical, with short slender neck.

Biology. The larvae of *A. stecki* feed within unopened capitula of *Hieracium abscissum* Less. (Asteraceae: Cichorieae) (Figs. 61–62). As reported by Goeden & Teerink (1997) for *A. dichromata*, the larvae of *A. stecki* form prepuparia which can wiggle and move to a limited extent within the flowerhead.

Distribution. *A. stecki* is known only from highland locations (> 1850 m elevation) in Guatemala and southern Mexico (Chiapas). Its distribution may be more extensive as its host plant ranges from central Mexico to western Panama at elevations over 1000 m (TROPICOS database).

Type data. Holotype ♂ (USNM USNMMENT00671084), GUATEMALA: Zacapa: road to plateau N of San Lorenzo, 15.0953°N 89.67203°W, 1894 m, emerged 28 Nov 2007–21 Jan 2008 reared ex flowerheads of *Hieracium abscissum* (07G32) collected 18 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón. Paratypes: same data as holotype 5♂ 5♀ (USNM USNMMENT00212026, USNMMENT00671082–83, USNMMENT00671085–92), 1♂ 1♀ (UVG USNMMENT00671093–94), 1♂ 2♀ (FSCA); same data except emerged 17 Mar 2008, 1f (USNM USNMMENT00104211). MEXICO: Chiapas: San Cristobal de Las Casas, 7087 ft. [2161 m], 29 Jun 1969, 1♀ (CNC USNMMENT00215050).

Etymology. This species is named for Gary Steck, one of the collectors of the type series.

Acinia picturata (Snow)

Biology. A large series of specimens was reared in Guatemala from flowerheads of *Pluchea carolinensis* (Jacq.) Sweet (Asteraceae: Inuleae), a new host plant record for this species. Five other species of *Pluchea* have been reported previously as host plants of *A. picturata*.

Material examined. GUATEMALA: Huehuetenango: San Idelfonso Ixtahuacan, along river, 15.41551°N 91.76618°W, 1598 m, emerged 28 Nov–12 Dec 2007 reared ex flowerheads of *Pluchea carolinensis* (07G62) collected 24 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, F. Camposeco, 46♂ 34♀ (USNM, FSCA, UVG).

Acrotaenia otopappi (Doane)

Remarks. This species differs from other *Acrotaenia* species in a number of characters, in some of which it more resembles the “Higher Tephritinae” (sensu Korneyev 1999), particularly some Eutretini. Despite the strong similarity to other *Acrotaenia* species in wing pattern, its classification should be considered tentative. The differences in *A. otopappi* include: lateral vertical seta slightly lanceolate, whitish, paler than and approximately 1/3 as long as medial vertical seta which is pale brown (in other *Acrotaenia* acuminate, same color as and 2/5–3/5 as long as medial vertical seta, both yellow to orange); frons setulose anteromedially (not setulose in other *Acrotaenia* and other Acrotaeniini); postocular setae mixed large whitish lanceolate and small slightly darker pale brown acuminate (subequal, concolorous whitish, slightly lanceolate in other *Acrotaenia*, although also mixed in *Acrotaeniacantha*, *Baryplegma*, *Neotaracia*, and some *Tetreuaresta* species); parafacial sometimes with brown spot at level of base of antenna (lacking in other *Acrotaenia*); enlarged costal setae at subcostal break 3–4 times as long as other costal setulae and distinctly projecting, subequal to width of cell c (in other *Acrotaenia* poorly differentiated or less than 3 times as long as other costal setulae and no more than half width of cell c, not distinctly projecting); cell r_1 with 1–2 medial (nonmarginal) ovoid white spots near apex of vein R_1 (lacking in other *Acrotaenia*; probably autapomorphy of *A. otopappi*); vein R_{2+3} sinuous on distal half (nearly straight or gradually curved in other *Acrotaenia*); lobe of cell bcu short, at most 1/3 width of cell (more than 1/2 width of cell in other *Acrotaenia* and other Acrotaeniini); subbasal hyaline area across basal cells continuous from costa to anal lobe or at most narrowly interrupted in cell br (lacking in other *Acrotaenia*); aculeus tip notched (entire in other *Acrotaenia*, South American species not checked); glans with acrophallus long and slender, closely associated with broader bluntly pointed lobe, and with 1–2 shorter, somewhat blade-like lobes arising near midlength, sclerotized outer sheath distally with row of teeth-like projections (in other *Acrotaenia*, *Neotaracia*, *Caenoriata*, *Pseudopolionota*, and *Eutretopsis* species examined, acrophallus composed of single, broader tube, and glans without other lobes on distal half, with only short inward projections from outer sheath, sheath without apical teeth-like projections).

Distribution. Norrbom et al. (1999) reported this species from “Mexico (Sinaloa & Durango SE to Morelos)”. Data supporting these records are listed below. We have also collected it in Chiapas and Guatemala.

Biology. Specimens were reared in Guatemala from flowerheads of *Perymenium grande* Hemsl. and *P. ghiesbreghtii* B.L. Rob. & Greenm., and in Mexico from flowerheads of *Perymenium gracile* Hemsl. The only previously reported host plant for this species is *Otopappus acuminatus* S. Watson based on a “female found dead in head” of the plant (Doane 1899). Both plant genera belong to the Asteraceae: Heliantheae: Ecliptinae.

Material examined. GUATEMALA: Sacatepéquez: Cerro Alux, 14.60552°N 90.64293°W, 2178 m, emerged 10–20 Dec 2007 reared ex flowerheads of *Perymenium grande* (07G01) collected 11 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, 1♂ 3♀ (USNM USNMENT00671230–33), 3♀ (FSCA), 1♀ (UVG); Volcan de Agua, trail from Santa Maria de Jesus, 14.47464°N 90.71904°W, 2415 m, emerged 26 Dec 2007 reared ex flowerheads of *Perymenium grande* (07G11) collected 13 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, 1♀ (USNM USNMENT00212025). Zacapa: road to plateau N of San Lorenzo, 15.10894°N 89.67796°W, 2097 m, reared ex flowerheads of *Perymenium ghiesbreghtii* (07G27A), 18 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 1♀ (USNM USNMENT00104322), 1♂ (FSCA), 1♂ (UVG); road to plateau N of San Lorenzo, trail beyond campsite, 15.11561°N 89.68412°W, 2218 m, emerged 23–30 Jan 2008 reared ex flowerheads of *Perymenium ghiesbreghtii* (07G27) collected 17 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 1♂ 3♀ (USNM USNMENT00654013–16). MEXICO: Chiapas: between Chiquihuites & Union Juarez, 15°5'N 92°5'W, 1500–1800 m, reared ex flowerhead of *Perymenium gracile* Hemsl. (93M4) collected 30 Oct 1993, A. L. Norrbom & C. Estrada, 1♀ (USNM USNMENT00104373). Durango: 10 mi. W of La Ciudad, Buenos Aires, 9000 ft., 11 Jun 1964, J. F. McAlpine, 1♂ (CNC); Durango, 30 mi. W of, 8000 ft., 6 Jun 1964, J.F. McAlpine, 1♀ (CNC); El Salto, 11 mi. E of, 8000 ft., 13 Jun 1964, J. F. McAlpine, 3♂ 1♀ (CNC); El Salto, 20.4 mi. NE of, 21 Jul 1982, 1♀ (SDNHM); La Ciudad, 24 mi. W of, 7000 ft., 25 Jun 1964, J. F. McAlpine, 1♀ (USNM USNMENT00214257); La Ciudad, 30 mi. W of, 6506 ft., Malaise trap, 25 Jul 1964, J. F. McAlpine, 1♂ (CNC). Morelos: Cuernavaca, Nov 1944, N. L. H. Krauss, 8♂ 5♀ (USNM USNMENT00104403–15); Cuernavaca, Nov 1944, N. L. H. Krauss 116, 2♀ (USNM

USNMENT00104416–17); El Vigía, 5 km N of, on Rt. 142, Km 48–50, 28 Sep–1 Oct 1991, A. L. Norrbom, 2♂ 2♀ (USNM USNMENT00214354–57); Tres Cumbres, 2.5 mi. S of, 1 Aug 1962, P. D. Hurd, 1♀ (UCB). Sinaloa: Concordia, 20 mi. E of, 3000 ft., 8 Aug 1964, 1♂ (CNC), 1♂ (USNM USNMENT00053820); El Palmito, 4.5 mi. W of, 6300 ft., 15 Jul 1964, J. F. McAlpine, 1♂ (CNC).

Agallamyia Norrbom, new genus

Type species: *A. pendula* Norrbom, new species.

Diagnosis. *Agallamyia* resembles *Pyrgotoides* Curran in general habitus and in having a setulose lunule, but differs as follows: Wing (Fig. 33) with only narrow irregular hyaline streaks in addition to hyaline triangle on anterior margin distal to apex of vein R_1 , without large hyaline areas on posterior margin as in *Pyrgotoides*; male fore femur (Fig. 14) very stout, with row of ventral setae stout and spinelike (the male fore femur is sometimes stout in *Pyrgotoides*, but the ventral setae are more slender and not spinelike); tibiae not exceptionally stout (often very stout in *Pyrgotoides*); and eversible membrane (Fig. 15) similar dorsally and ventrally, both sides with broad medial area of spinules with sharply delimited transition from larger to minute spinules (ventral stripes of spinules extended from the taenia separate, not fused to form single narrow medial stripe as in *Pyrgotoides*). Based on the difference in the eversible membrane, the similarities in external characters between *Agallamyia* and *Pyrgotoides* are probably due to convergence. The fusion of the ventral stripes of spinules on the eversible membrane as in *Pyrgotoides* was considered a synapomorphy of the Dithrycini by Korneyev (1999), although his classification of this group was not supported by Han et al. (2006). Unless the condition in *Agallamyia* is secondarily derived, *Agallamyia* appears to belong to the Cecidocharini rather than the Dithrycini. *Agallamyia* is probably most closely related to *Ostracocoelia* Giglio-Tos, which has a similar eversible membrane, short thoracic setae, stout, ventrally spinose male fore femur, and sometimes setulose lunule (in *Ostracocoelia* the lunule is never as densely setulose as in *Agallamyia*, but often has one to several fine setulae). All of these characters are apomorphic and probably are synapomorphies for these two genera. *Agallamyia* differs from *Ostracocoelia* in wing pattern (not banded), thoracic microtrichia (without large shiny nonmicrotrichose areas on anepisternum and scutellum as in *Ostracocoelia*), chaetotaxy (e.g., presutural supra-alar seta absent, scutellum setulose), and eye size (genal height more than half long diameter of eye vs. less than half (0.29–0.35) in *Ostracocoelia*).

Description. Relatively large, brown. Setae short.

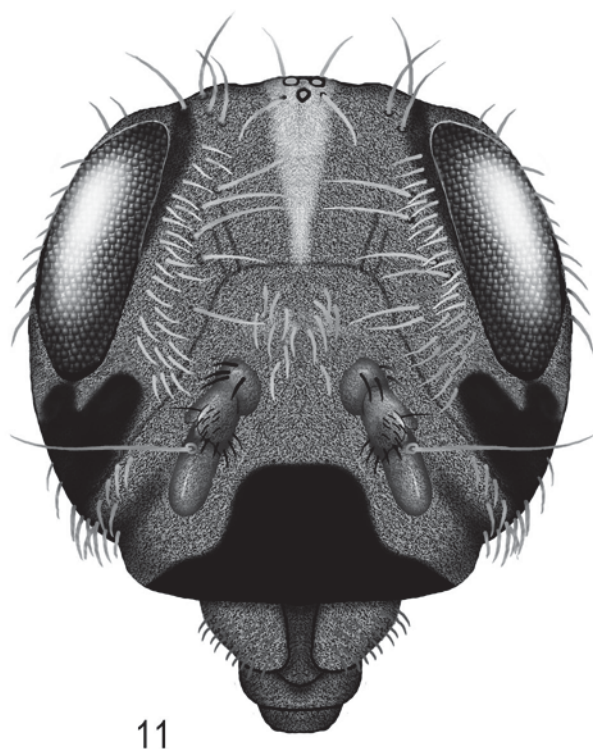
Head (Figs. 11–12): Frons broad, nonsetulose anteromedially. Setae relatively short; 2 orbital setae; medial and lateral vertical setae subequal; postocular setae acuminate, subequal, yellow. Face with broad carina. Lunule large and setulose. Eye relatively small.

Thorax (Fig. 13): With following setae short (length less than distance between acrostichal setae): postpronotal, 2 notopleural, usually 1 postsutural supra-alar (absent in 2 specimens and on 1 side in 2 others; when present relatively posterior in position, at 1/2–3/4 distance from transverse suture to posterior margin of scutum), 1 intra-alar, 1 postalar, 0–1 dorsocentral (aligned with postsutural supra-alar seta to midway between it and postalar seta), 1 acrostichal, and 2 scutellar; anepisternal and anepimeral setae sometimes poorly or not differentiated from setulae; presutural supra-alar seta and katepisternal seta absent. Mesonotum without shiny, nonmicrotrichose area. Scutellum short and convex.

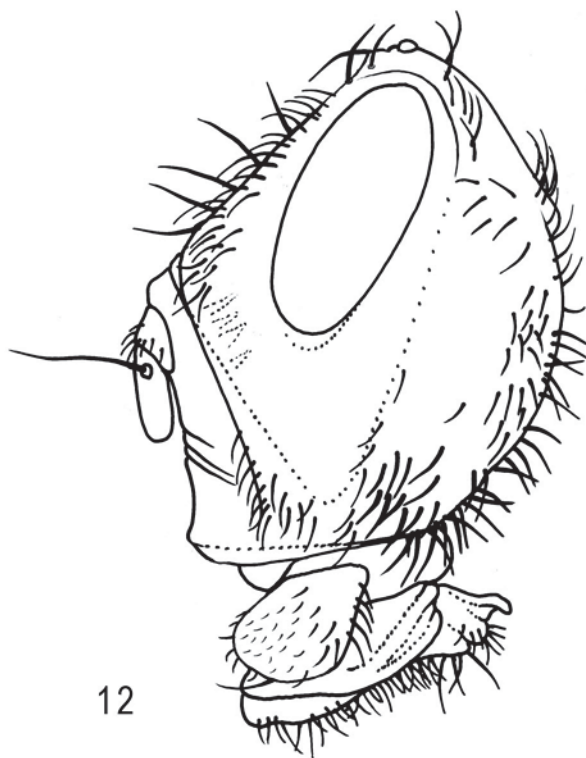
Legs: Stout. Male fore femur with row of ventral setae stout and spinelike. Hind femur with preapical setae undifferentiated.

Wing (Fig. 33): Elongate and relatively narrow. Pterostigma short and narrow. Subcosta with apical part weak, turned anterodistally at 45° angle. Costal setulae at subcostal break undifferentiated, no larger than other costal setulae. Vein R_1 dorsally without gap in setulae near bend in vein Sc. Vein R_{4+5} dorsally intermittently setulose. Lobe of cell bcu moderately long. Crossvein $r-m$ distinctly distal to midlength of cell dm . Pattern predominantly brown, with only narrow irregular hyaline to yellowish streaks in addition to hyaline triangle on anterior margin distal to apex of vein R_1 .

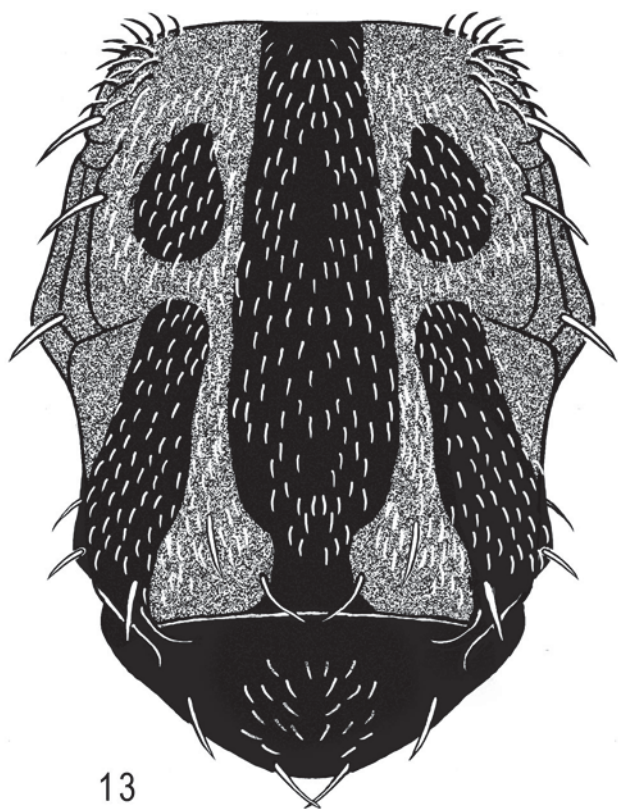
Abdomen: Tergites without shiny nonmicrotrichose areas.



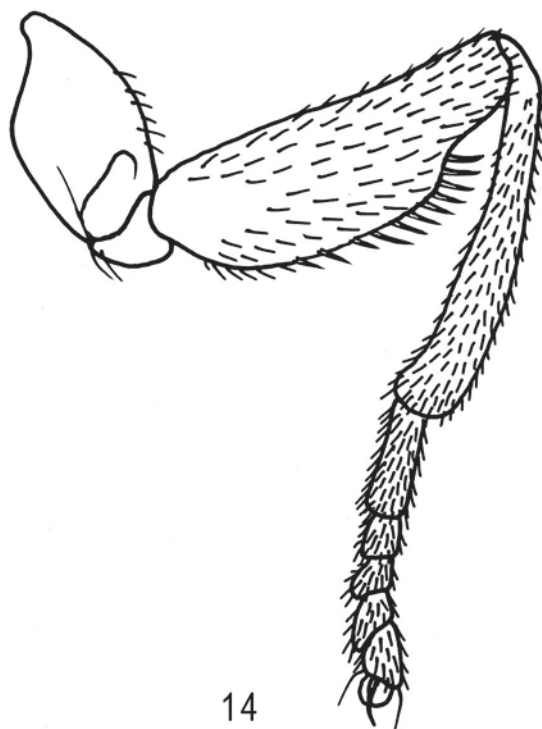
11



12



13



14

FIGURES 11–14. *Agallamyia pendula* (Guatemala: Volcan de Agua, USNMENT00213296): 11, head, anterior; 12, head, lateral; 13, thorax, dorsal; 14, male right foreleg, posterior.

Male terminalia: Surstyli short. Glans with relatively stout sclerotized part including laterally curved acrophallus.

Female terminalia: Eversible membrane (Fig. 15) similar dorsally and ventrally, with pair of short taenia extended to single broad oval medial area of spinules with sharply delimited transition from larger spinules anteriorly and narrowly laterally to minute spinules medially and posteriorly. Aculeus with slender, simple tip.

Etymology. This name is derived from the Spanish “agalla” (gall) and Greek “myia” (fly). It is considered feminine in gender.

***Agallamyia pendula* Norrbom, new species**

Figs. 11–20, 23–25, 27–29, 33

Description. Large, body length 5.5–11.5 mm. Mesonotum length 2.0–4.0 mm. Wing length 5.0–10.0 mm, width 1.6–3.7 mm, ratio 2.63–3.17. Mostly brown. Setae usually yellow (mostly brown in 2 males), short, acuminate. Setulae yellowish.

Head (Figs. 11–12): Broad. Mostly microtrichose; anterior margin of parafacial, large anteroventral area on gena, and broad, bell-shaped ventral area on face shiny, nonmicrotrichose. Frons more than 2 times as broad as width of eye, with 4–9 frontal setae surrounded by numerous setulae, and 2 orbital setae, posterior seta often laterocline. Ocellar seta 2–3 times as long as ocellar tubercle. Postocellar seta usually well developed (absent in 1 male), 2/3 as long as to subequal to medial vertical seta, always yellow. Medial and lateral vertical setae subequal, 1/3–2/5 height of face. Lunule large and setulose (Fig. 11), half as long as wide. Eye relatively small, genal height more than half (0.52–0.71) long diameter of eye (Fig. 12). Antennae widely separated by 1.3–2 times width of scape, short, first flagellomere ca. 1.67 times as long as wide, no longer than pedicel, occasionally (2 specimens) with several dorsal setulae; arista minutely and sparsely pubescent (appearing bare except at high magnification). Proboscis large, capitate; palpus very broad, 3/5–2/3 as wide as long, oval.

Thorax (Fig. 13): Microtrichose except extreme anteromedial margin of scutum and large ventral area on mediotergite. Scutum usually mostly dark red brown, with blackish broad medial vitta and less well defined pre- and postsutural sublateral areas, sometimes more extensively blackish; setulae yellowish, less dense on blackish areas. Scutellum short, high and convex, red brown to dark brown, without distinct yellow markings; setulose.

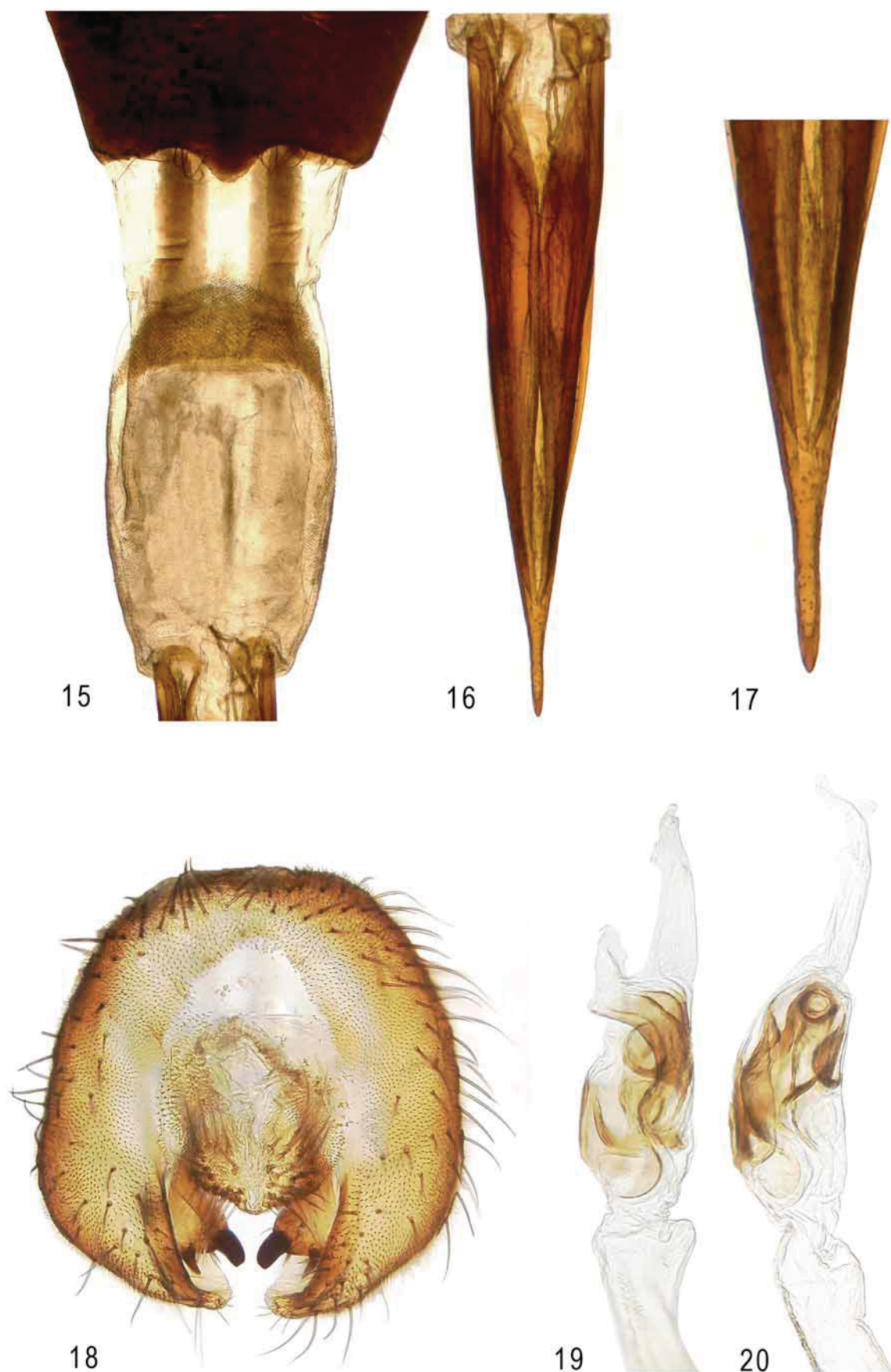
Legs: Stout, especially male fore femur, on which row of ventral setae stout and spinelike (Fig. 14). Coxae and femora dark brown. Tibiae moderate to dark brown. Basal 2–3 tarsomeres yellow, distal tarsomeres brownish.

Wing (Fig. 33): Elongate and relatively narrow. Pterostigma short and narrow, 1/5–1/4 length of cell c. Vein R_{4+5} dorsally intermittently setulose to or beyond level of crossvein dm-cu. Lobe of cell bcu ca. half as long as width of cell. Crossvein r-m at 0.67–0.75 distance from bm-cu to dm-cu. Pattern predominantly brown, usually more orange in radial cells except br and proximal 2/3 of r_{4+5} , cell bcu and sometimes other basal cells, alula, and part of area bordering vein A_1+Cu_2 . Cell r_1 with 1 narrow to broad triangular marginal hyaline area aligned with or slightly distal to crossvein r-m, extending to vein R_{4+5} ; r-m usually with narrow hyaline or yellow border. Cell c with small, sometimes diffuse, yellowish or hyaline spot or streak in basal third. Cells r_1 , r_{2+3} , and r_{4+5} with narrow oblique hyaline streak or series of spots subapically, often irregular in shape. Cell m medially with irregular, usually somewhat inverted V-shaped or triangular, hyaline mark or series of spots, extending anteriorly into cell r_{4+5} or rarely with aligned spot in r_{4+5} , aligned slightly posterobasal to oblique mark in radial cells. Cell bm with narrow hyaline streak along transverse fold. Cell cu_1 with narrow, elongate hyaline streak in basal 2/3 of cell, often broader distally and/or fading to pale brown posteriorly. Cell dm posteromedially and distal third of cell cu_1 with narrow curved hyaline streak or series of spots.

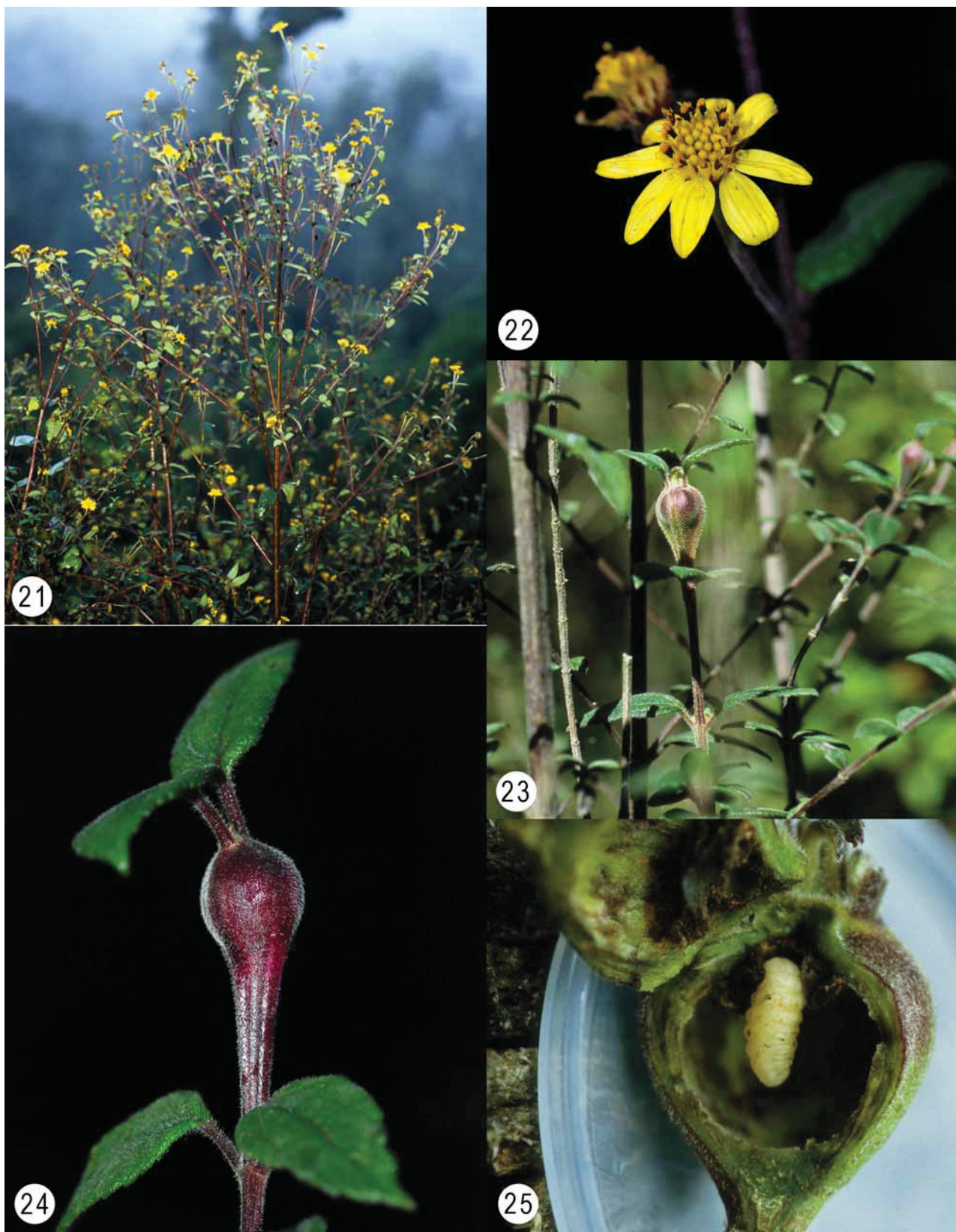
Abdomen: Entirely brown. Tergites entirely microtrichose.

Male terminalia: Surstyli short, together with epandrium nearly oval (Fig. 18). Glans (Figs. 19–20) with sclerotized basal half stout and distal half slender, membranous; acrophallus relatively stout and strongly laterally curved.

Female terminalia: Oviscape 1.2–1.9 mm long, 0.55–0.59 times as long as mesonotum. Setulae on medial half to 3/4 inclinate. Aculeus (Figs. 16–17) elongate, slender, 1.70–2.25 mm long, 6.5–7.5 times as long as wide, gradually tapering to needlelike apex. Spermathecae small, ovoid.



FIGURES 15–20. Terminalia, *Agallamyia pendula*: female (Guatemala: San Miguel Dueñas, USNMENT00213288): 15, eversible membrane, ventral; 16–17, aculeus, ventral; male (Guatemala: Volcan de Agua, USNMENT00213295): 18, epandrium and surstyli, posterior; 19–20, glans, dorsal and lateral.

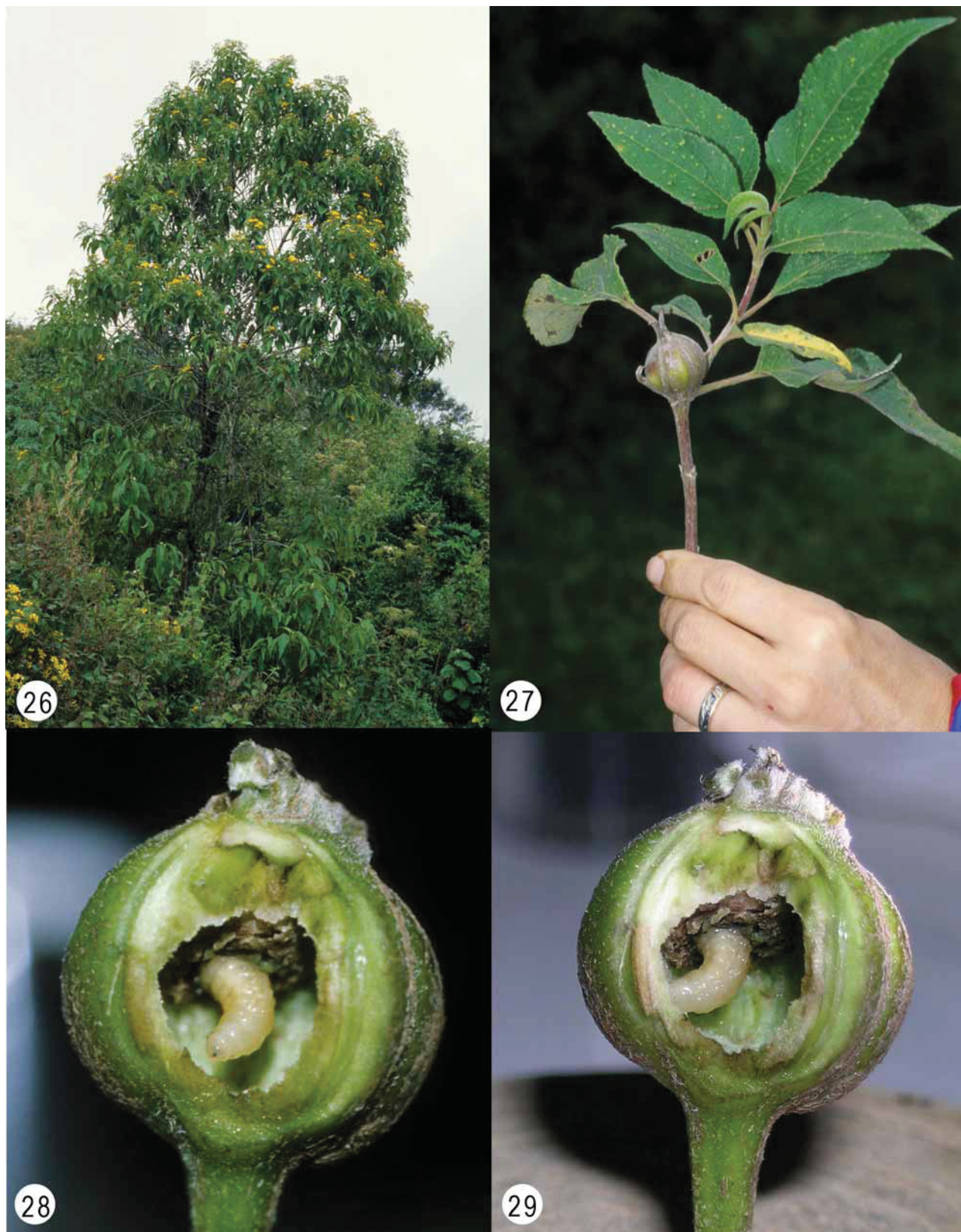


FIGURES 21–25. *Perymenium ghiesbreghtii*, host plant of *Agallamyia pendula*: 21, inflorescences; 22, flowerhead; 23, galls in situ; 24, gall; 25, opened gall showing larva with hind end anchored in frass mass.

Biology. *Agallamyia pendula* forms a large spherical stem gall up to 2.5 cm in diameter on *Perymenium ghiesbreghtii* B.L. Rob. & Greenm. (Figs. 21–25) and *P. grande* Hemsl. (Figs. 26–29) (Asteraceae: Heliantheae). The gall is unusual in being mostly hollow, with the single puparium sometimes loose inside.

The larva anchors its posterior end in a frass mass in the top of the gall and feeds on the sides of the gall while hanging downward (Figs. 25, 28–29). The exit hole for the adult is in the middle of the frass mass.

Distribution. Known only from highland areas (> 1700 m elevation) of Guatemala (Baja Verapaz, Huehuetenango, Sacatepéquez, Zacapa; Santa Rosa?).



FIGURES 26–29. *Perymenium grande*, host plant of *Agallamyia pendula*: 26, whole plant; 27, gall; 28, opened gall showing larva with hind end anchored in frass mass; 29, same, larva rasping inside of gall.

Type data. Holotype ♀ (USNM USNMENT00212040), GUATEMALA: Huehuetenango: 8.6 km (air) NW of Cuilco, 15.44475°N 92.03582°W, 2108 m, emerged 18 Dec 2007–2 Jan 2008 reared ex stem gall on *Perymenium grande* collected 24 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, F. Camposeco. Paratypes: GUATEMALA: Baja Verapaz: Finca Santa Rosa, Pantin - Salama Road, 15.24515°N 90.28169°W, 1729 m, emerged 22 Dec 2007 reared ex stem gall on *Perymenium grande* (07G44) collected 20 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, 1♀ 1 puparium (USNM USNMENT00104327, USNMENT00212035). Huehuetenango: 8.6 km (air) NW of Cuilco, 15.44475°N 92.03582°W, 2108 m, emerged 18 Dec 2007–2 Jan 2008 reared ex stem gall on *Perymenium grande* collected 24 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, F. Camposeco, 1♂ 1 puparium (USNM USNMENT00104329, USNMENT00212024), 1♀ (UVG). Sacatepéquez: Cerro Carmona, Finca El Pilar, 14.54176°N 90.71384°W, 1773 m, emerged 18 Dec 2007 reared ex stem galls on *Perymenium grande* collected 14 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, 1♂ (FSCA USNMENT00212038). San Miguel Dueñas, 3–6 km W of, reared ex stem gall on *Perymenium grande* Hemsl. (90G7) collected 17 Oct 1990, A. L. Norrbom, 2♂ 1♀ 4 puparia (USNM USNMENT00213286–89); Volcan de Agua, trail from Santa Maria de Jesus, 14.47464°N 90.71904°W, 2415 m, emerged 18–26 Dec 2007 reared ex stem galls on *Perymenium grande* (07G11) collected 13 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, 1♀ 2 puparia (USNM USNMENT00104326, USNMENT00212039), 1♂ 1♀ (FSCA USNMENT00212034); Volcan de Agua, trail from Santa Maria de Jesus, reared ex stem gall on *Perymenium grande* Hemsl. (90G15), 21 Oct 1990, A. L. Norrbom, 1♂ (USNM USNMENT00213285); Volcan de Agua, trail from Ciudad Viejo, reared ex stem gall of *Perymenium grande* Hemsl. (90G15), 19 Oct 1990, A. L. Norrbom, 4♂ (USNM USNMENT00213293–96). Zacapa: road to plateau N of San Lorenzo, near campsite at end of road, 15.1166°N 89.68259°W, 2215 m, emerged 10–26 Dec 2007 reared ex stem gall on *Perymenium ghiesbreghtii* (07G27) collected 16 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 2♂ 3♀ 4 puparia (USNM USNMENT00212029–30, USNMENT00671391–94), 1♂ 2♀ (FSCA).

Other material examined. GUATEMALA: Santa Rosa: Cerro Mira Mundo, Finca Mira Mundo, 14.20402°N 90.51535°W, 1850 m, 21–24 May 2008, B.D. Sutton & J. Monzón, 1 dead adult that appears to be this species found in the exit hole of a gall on a scrubby *Perymenium* sp.

Etymology. The name of this species is an adjective and refers to the habit of the larva of hanging from its posterior end within the gall.

Dictyotrypeta crenulata (Wulp), new combination

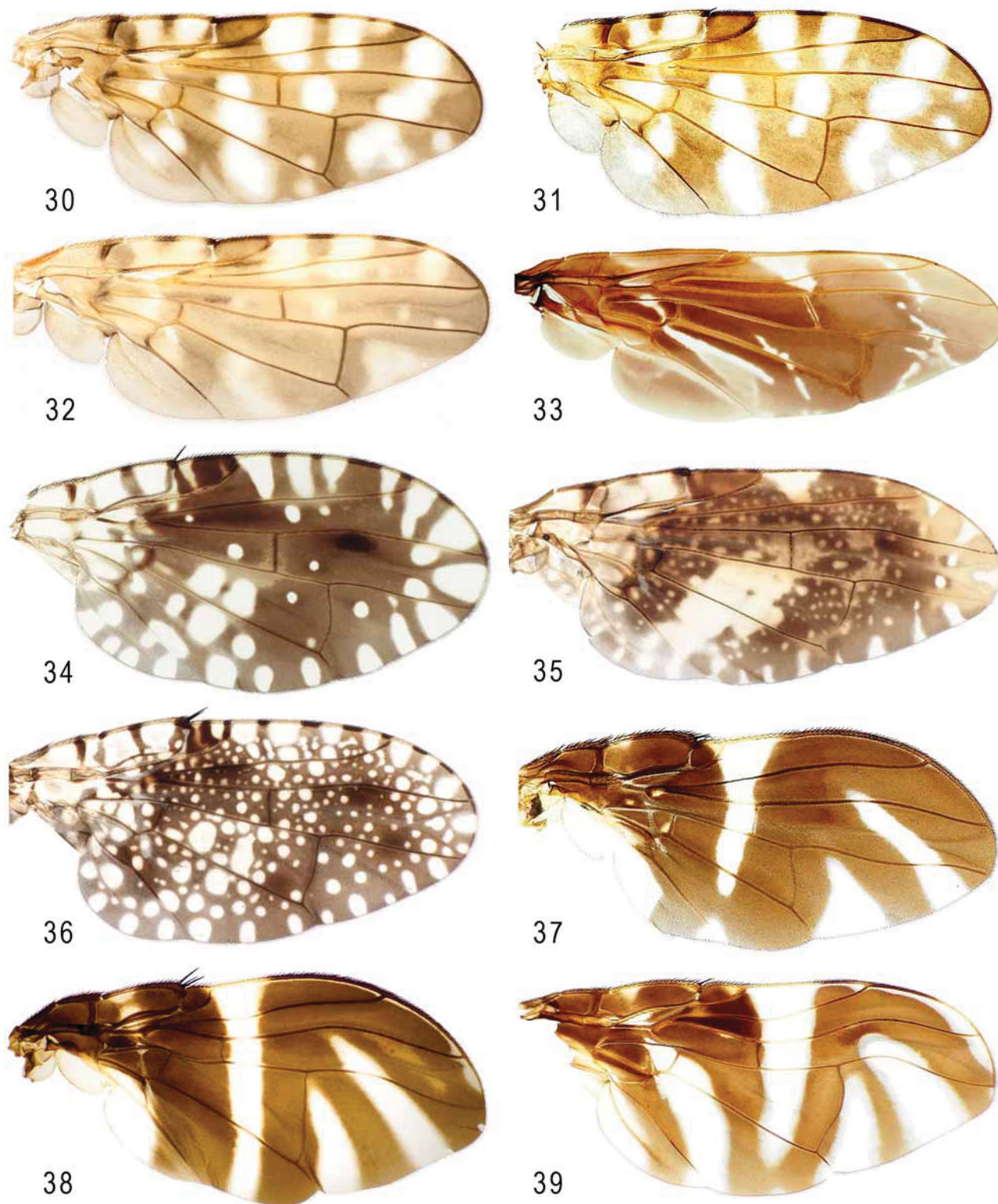
Fig. 34

Euaresta crenulata Wulp 1900: 423.

Tetreuaresta crenulata: Foote 1965: 246.

Foote (1965) placed this species in *Tetreuaresta*, which it resembles in having a radiate wing pattern (Fig. 34), but the following characters that are otherwise not present in that genus indicate that *D. crenulata* doubtfully belongs there: parafacial with brown spot at level of base of antenna; frons setulose medially; cell r_{4+5} with strong bulla anterodistal to crossvein dm-cu; and length of posteroapical lobe of cell bcu less than one-third width of cell. The eye color, which usually fades after death, includes a single narrow horizontal stripe aligned with the parafacial spot in *Dictyotrypeta* but is unknown for *D. crenulata*, but this species is tentatively transferred to *Dictyotrypeta* on the basis of the above characters. The wing pattern in most *Dictyotrypeta* species is more reticulate (Fig. 36), although the marginal hyaline spots are often largest, and several species have radiate patterns.

Material examined. MEXICO: Guerrero: Chilpancingo, 4600 ft. Jun, H. H. Smith, ♂ lectotype (BMNH). Morelos: Cuernavaca, Jun, H. H. Smith, 3♂ paralectotypes (BMNH), 1♂ paralectotype (MCZ). Sinaloa: 38 mi NE Concordia, near Loberas, 3 Jul 1982, 1♂ (SDNHM USNMENT00104458) 1♂ (USNM USNMENT00104457); El Palmito, 15 km W of, 1800 m, 14 Jun 1986, M. Sorensson & B. Martensson, 1♀ (ZIL USNMENT00104465). Veracruz: Maltrata, Crawford, 1♂ (USNM USNMENT00214439).



FIGURES 30–39. Wings: 30–32, *Acidogona stecki* (female, Guatemala: N of San Lorenzo, USNMENT00671092; female, Mexico: San Cristobal de las Casas, USNMENT00215050; male, Guatemala: N of San Lorenzo, USNMENT00671087); 33, *Agallamyia pendula* (Guatemala: Volcan de Agua, USNMENT00213295); 34, *Dictyotrypeta crenulata* (Mexico: nr. Loberas, USNMENT00104458); 35, *D. incisa* (Mexico: Veracruz: E. Citlaltetpetl, USNMENT00214367); 36, *D. sysemma* (Peru: El Chota, USNMENT00104459); 37, *Dracontomyia borrichia* (USA: Laguna Madre, USNMENT00215089); 38, *D. elegans* (Brazil: Petropolis, USNMENT00104256); 39, *D. riveti* (Ecuador: 14 mi E Cuenca, USNMENT00213085).

***Dictyotrypeta incisa* (Wulp), new combination**

Fig. 35

Acrotaenia incisa Wulp 1899b: 415.

Acrotaenia (*Pseudacrotaenia*) *incisa*: Hendel 1914: 59.

Pseudacrotaenia incisa: Aczél 1950: 270.

Baryplegma incisa: Norrbom et al. 1999: 105.

This species was transferred to *Baryplegma* by Norrbom et al. (1999) when they placed *Pseudacrotaenia* in synonymy with *Baryplegma* (Acrotaeniini), but it is here classified in *Dictyotrypeta* (Eutretini). Although its wing pattern (Fig. 35) is almost radiate and somewhat resembles the patterns of some *Baryplegma* species, it is more similar to those of many *Dictyotrypeta* species. Vein R_{4+5} is extensively setulose dorsally (occurs in both genera), the parafacial has a brown spot at the level of the base of the antenna (occurs in all *Dictyotrypeta* species, but no *Baryplegma*), the frons is setulose medially as in most Eutretini, whereas it is bare in Acrotaeniini, the eye has a single narrow horizontal stripe aligned with the parafacial spot (synapomorphy of *Dictyotrypeta* species), cell r_{4+5} has a bulla anterodistal to crossvein dm-cu (variable in *Dictyotrypeta*, absent in *Baryplegma*), and the length of the posteroapical lobe of cell bcu is less than half the width of the cell (it is longer in *Baryplegma*).

Distribution. Mexico (Chiapas, Guerrero, Veracruz) and Guatemala. The specimens listed below include the basis for the Mexican records other than the type locality reported by Norrbom et al. (1999), as well as the first records from Guatemala.

Biology. Host plants have not been reported previously for this species. We reared it in Guatemala and Mexico from flowerheads of *Smallanthus maculatus* (Cav.) H. Rob. (Figs. 114–115) and *S. riparius* (Kunth) H. Rob. (Asteraceae: Heliantheae: Milleriinae).

Material examined. GUATEMALA: Sacatepéquez: Cerro Carmona, Finca El Pilar, 14.53071°N 90.69018°W, 2265 m, emerged 22–25 Dec 2007 reared ex flowerheads of *Smallanthus maculatus* (07G02) collected 12 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, 3♂ 1♀ (USNM USNMENT00671234–39), 2♂ (FSCA); San Miguel Dueñas, 3–6 km W, reared ex flowers *Smallanthus maculatus* (90G10), 17 Oct 1990, A. L. Norrbom, 1♀ (USNM USNMENT00671241). MEXICO: Chiapas: NW of Union Juárez, Chiquihuites, ~15°5'N 92°6'W, 1800–2000 m, collected on *Smallanthus riparius* (93M3), 4 Nov 1993, A. L. Norrbom, L. E. Carroll & C. Estrada, 1♂ 1♀ (USNM USNMENT000214430–31), 1♀ (IEXV); same, reared ex flowers of *Smallanthus maculatus* (94M3), 2–5 Nov 1994, A. L. Norrbom, L. E. Carroll & C. Estrada, 7♂ 7♀ (USNM USNMENT00052348–61), 1♂ 1♀ (BMNH USNMENT00052364–65), 1♂ 1♀ (FSCA USNMENT00052362–63); between Chiquihuites & Union Juárez, 15°5'N 92°5'W, 1500–1800 m, reared ex flowers of *Smallanthus riparius* (93M3), 30 Oct 1993, A. L. Norrbom & C. Estrada, 3♂ 1♀ (USNM USNMENT00214375–78), 1♀ (IEXV), 1♂ (Programa MoscaMed); San Cristobal de Las Casas, 7087 ft., 3–7 Jun 1969, B. V. Peterson, 1♂ (CNC USNMENT00214365). Guerrero: Omilteme, 8000 ft., Jul, H. H. Smith, 1♂ paralectotype (USNM). Veracruz: Citlaltepetl, E of, 7000 ft., 21 Jul 1964, L. W. Swan, 1♀ (CAS USNMENT00214367).

***Dioxyna crockeri* (Curran), new combination**

Paroxyna crockeri Curran 1934: 157.

Campiglossa crockeri: Norrbom et al. 1999: 109.

This species was described in *Paroxyna* by Curran (1934) and was transferred to *Campiglossa*, the senior synonym of *Paroxyna*, by Norrbom et al. (1999). However, the long proboscis, elongate head, and lack of spinules on the phallus proximal to the glans in this species indicate that it belongs in *Dioxyna* rather than *Campiglossa*. It is known only from the Galápagos Islands.

Dracontomyia Becker

Figs. 37–39

Dracontomyia Becker 1919: 193 (type species *D. riveti* Becker, by monotypy).

Cecidocharella Hendel 1936: 74 (type species *C. elegans* Hendel, by monotypy). **New synonymy.**

Cecidocharella Hendel is here considered a subjective junior synonym of *Dracontomyia* Becker, and the three species originally described in the former genus are transferred to *Dracontomyia*. These include *D. tucumana* (Aczél 1953: 118), **new combination**, from Argentina, *D. borrichia* (Bush & Huettel 1970: 89), **new combination**, from USA (southern coastal Texas), and *D. elegans* (Hendel 1936: 75), **new combination**, from southern Brazil, Paraguay, and northern Argentina. The genus also includes *D. footei* Aczél (Ecuador, Peru), *D. riveti* Becker (Ecuador), and three undescribed species (Argentina, Bolivia).

Dracontomyia species breed in Asteraceae. At least two of the South American species are gall-formers (Norrbom, unpubl. data), but *D. borrichia* breeds in flowers of *Borrichia frutescens* (Bush & Huettel, 1970). The described species were keyed by Aczél (1953) and Bush & Huettel (1970, as *Cecidocharella*).

Aczél (1953), Bush & Huettel (1970), and Foote (1980) used several wing characters to distinguish *Dracontomyia* and *Cecidocharella*, but they all intergrade when the three undescribed species are included. It should be noted that fig. 42 of Foote (1980) of the wing of “*Cecidocharella* sp.” is *Stenopa mexicana*, and fig. 58 of “*Dracontomyia footei*” is *D. riveti*. The shape of the pterostigma is strongly different only in *D. footei*; it is subtriangular in *D. riveti* (Fig. 39) and one new species, intermediate between the triangular shape in *D. footei* and the subrectangular shape in the remaining species (Figs. 37–38). Vein R_{2+3} length and the related ratio of distance between the apices of R_1 and R_{2+3} / distance between the apices of R_{2+3} and R_{4+5} are intermediate in *D. elegans* (Fig. 38), *D. tucumana*, and two new species (ratio 1.5–2.0), shorter than in *D. borrichia* (2.30–2.42) (Fig. 37) but longer than in *D. footei*, *D. riveti* (Fig. 39) and one new species (0.76–1.38). Foote’s (1980) use of the length of “cell R” (= cell br) probably was an error referring to the shape of cell r_1 , which is also directly related to the length of vein R_{2+3} . The bulla at the base of R_{2+3} is present only in *D. footei* and *D. riveti* (Fig. 39), and that in cell r_{4+5} anterior to crossvein dm-cu varies from weak to absent in *D. borrichia*, to weak in *D. elegans* and one new species, moderate in two new species, and strong in *D. footei* and *D. riveti*.

In addition to the intergradation of the previously proposed diagnostic characters, *D. elegans* (the type species of *Cecidocharella*) and *D. tucumana* (the latter not examined, based on Aczél’s description) appear to be more closely related to the other species of *Dracontomyia* exclusive of *D. borrichia*. Thus *Cecidocharella* is paraphyletic if *D. borrichia* is included. Rather than proposing another genus for the latter species, it is preferable to synonymize *Cecidocharella* with *Dracontomyia*. Further study of the relationships of *D. borrichia* to test if it truly belongs in *Dracontomyia* would be useful.

Several probable synapomorphies support the closer relationship of *D. elegans* and *D. tucumana* to the other species of *Dracontomyia* than to *D. borrichia*: ratio of distance between apices of R_1 and R_{2+3} / distance between apices of R_{2+3} and R_{4+5} less than 2.0; cell dm broad, length of dm-cu/ width of radial cells anterior to it at least 0.85 (<0.60 in *D. borrichia*); distance from bm-cu to r-m along vein M/ distance from bm-cu to dm-cu less than or equal to 0.5 (0.60–0.66 in *D. borrichia*); cell m proximal marginal hyaline mark touching or almost touching dm-cu (well separated in *D. borrichia*); and mediotergite mostly to entirely microtrichose (except mostly nonmicrotrichose in one new species). One character conflicts with this hypothesis, instead supporting the closer relationship of *D. elegans*, *D. tucumana* and *D. borrichia*: scutum with postsutural sub-lateral shiny nonmicrotrichose area (also present in *D. tucumana*; and common in Cecidocharini, e.g., *Neorhagoletis*, many *Cecidochares* and *Procecidochares*).

The following are probably autapomorphies of *D. borrichia*: anepisternum with shiny nonmicrotrichose area anteriorly and katepisternum with small nonmicrotrichose area ventral to katepisternal seta (one or both of these sclerites are partially nonmicrotrichose in some Cecidocharini, e.g., *Ostracocoelia*, some *Cecidochares* and *Procecidochares*); vein R_{4+5} nonsetulose; hyaline band across middle of wing slightly oblique, at posterior wing margin including apex of vein A_1+Cu_2 (Fig. 37); and apical band not separated from costa by hyaline area.

Possible synapomorphies of *Dracontomyia* are the yellow anepimeral seta (also occurs in *Phacelochaeta*, n. gen., and some Cecidocharini) and the similar wing pattern (4–5 bands, apical 3 forming F-shaped mark), although the latter may be a synapomorphy with *Stenopa* Loew and is not uncommon in other tephritid genera.

Dracontomyia has been included in the tribe Cecidocharini but along with *Stenopa* was considered not to belong there by Korneyev (1999). *Phacelochaeta*, n. gen. (based on species previously included in *Cecidochores*) also may be related. The lateral vertical seta in these genera is no more than half as long as and often paler brown than the medial vertical seta (in the Cecidocharini it is subequal and the same color as the lateral vertical), and the postocular setae are mixed small, acuminate and larger, lanceolate, synapomorphies of the “Higher Tephritinae”, which does not include the Cecidocharini (Korneyev 1999). Another character that supports their removal from the Cecidocharini is their anteromedially setulose frons (except in *D. borrichia*; it is nonsetulose in most Cecidocharini).

Dracontomyia, *Stenopa* and *Phacelochaeta* may be closely related, although it should be noted that the putative synapomorphies for this clade also occur in some Cecidocharini. Synapomorphies for *Dracontomyia* + *Stenopa* + *Phacelochaeta* include: scutum with clusters of yellow lanceolate setulae near posterior margin, including at least 1 pair anterior to corners of scutellum (absent in *S. vulnerata* (Loew) and poorly differentiated in 1 undescribed species of *Dracontomyia*; common in Cecidocharini, e.g., *Neorhagoletis* with 2 pairs, *Hetschkomyia* with 1 pair, *Cecidochores* with 0–2 pairs); scutellum with clusters of lanceolate setulae, at least 1 pair basal to basal seta (absent in 3 species of *Dracontomyia* and variable in *S. vulnerata*; also common in Cecidocharini); microtrichia dark brown, contrasting with gray to tan color elsewhere, on posterior margin of scutum, scutellum, and/or subscutellum (occurs in some Cecidocharini, e.g., *Neorhagoletis*); scutellum strongly convex, shiny nonmicrotrichose medially (sparsely microtrichose in *Stenopa*; also occurs in most Cecidocharini); and wing banded and wing base (cell bc and base of br) infuscated (also occurs in most Cecidocharini). The wing patterns of *Dracontomyia* (Figs. 37–39) and *Stenopa* (Fig. 96) are especially similar, with the three most apical bands forming a somewhat F-shaped pattern (as in *Neorhagoletis*), whereas these bands, particularly that covering dm-cu, are oblique in *Phacelochaeta* (Figs. 54–56).

Dracontomyia footei Aczél

Distribution. Ecuador and Peru. Data for the record from Ecuador reported by Norrbom et al. (1999) and additional records are listed below.

Biology. A pair of specimens determined by Aczél in the IML collection were reared from stem galls on *Baccharis salicifolia* (Ruiz & Pav.) Pers. (= *B. lanceolata* Kunth) by W. K. Weyrauch in Peru.

Material examined. ECUADOR: Loja: Loja, 2500 m, 23–25 Mar 1965, L. E. Peña, 2♂ (CNC USNMENT00214254), 1♂ (USNM USNMENT00214255). PERU: Cascas, 1200 m, Weyrauch, 1♂ (IML); Elma, P. Aguilar, ♂ holotype, ♀ allotype (USNM), 1♂ 1♀ paratypes (IML). Cajamarca: Ajipampa, El Caota Mt., 1800 m, trap with hydrolyzed protein, 17 Jan 1968, P. G. Casanova C., 1♀ (USNM USNMENT00053779). Lima: Chosica, 15 km NE of, 500 m, 14 Sep 1954, E. I. Schlinger & E. S. Ross, 1♂ (CAS USNMENT00214404); Cumbe, 1800 m, ex McPhail trap, 15 May 2001, W. Zegarra, 1♀ (USNM USNMENT00213643); Lima, “Aus Stenelgallen von *Baccharis lanceolata*”, 24 Sep 1951, Weyrauch WKW 7018, 1♂ 1♀ (IML). Lima, Ciudad Universitaria, 70 m, Nov 1970, R. Garcia, 1♂ (MZUSP), 1♂ (USNM USNMENT00214386); Lurin V., 300 m, 28 Nov 1970, J. W. Boyes, 1♂ (CNC), 1♀ (USNM USNMENT00214266).

Dyseuaresta mexicana (Wiedemann)

Biology. This species has been reared from flowerheads of several species of *Melanthera* in Florida. In Guatemala we collected it at three localities almost exclusively on *Viguiera dentata* (Cav.) Spreng., which is a likely

host plant, although this needs confirmation by rearing. Both plant genera belong to the Asteraceae: Heliantheae.

Material examined. GUATEMALA: El Progreso: Hwy. CA-9, between Sanarete & El Rancho, 14.84679°N 90.12282°W, 690 m, sweeping flowering *Viguiera dentata*, 21 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 1♂ 8♀ (USNM USNMMENT00671530–38), 1♀ (FSCA), 1♀ (UVG). Huehuetenango: Huehuetenango - Cuilco Road (7W), E of Chejoj, 15.41056°N 91.82424°W, 1682 m, on flowering *Bidens pilosa* (07G64), 24 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, F. Camposeco, 1♂ (USNM USNMMENT00671519). Zacapa: Ojo de Agua, 15.0221°N 89.66787°W, 261 m, 15 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 2♂ 3♀ (USNM USNMMENT00671525–29); Santa Cruz - San Lorenzo Road, "cow pasture", 15.07329°N 89.68482°W, 1616 m, on *Viguiera dentata* (07G22), 15 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 6♂ 1♀ (USNM USNMMENT00671540–46), 1♂ (FSCA), 1♂ (UVG); Santa Cruz - San Lorenzo Road, escarpment base, 15.07682°N 89.683°W, on flowering *Viguiera dentata*, 19 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 1♂ (USNM USNMMENT00671539).

Euarestoides dreisbachi Foote

Distribution. Mexico (Chiapas, Distrito Federal, Durango, Guanajuato, Hidalgo, Jalisco, Michoacán, Nayarit, Oaxaca, San Luis Potosí, Sinaloa, Sonora, Veracruz, Zacatecas) and Guatemala. The specimens that formed the basis for the range of this species indicated by Norrbom et al. (1999), other than the specimens listed by Foote (1958), are listed below.

Biology. Foote (1958) listed the name "*Baccharis glutinosa*" with the data for a male paratype from San Juan del Rio, Durango, Mexico without indication whether the specimen was collected on or reared from this plant. This presumably refers to *B. glutinosa* auct., which = *B. salicifolia* (Ruiz & Pav.) Pers., and not *B. glutinosa* Pers., which does not occur in this part of Mexico. We have reared *E. dreisbachi* from *B. salicifolia* in Guatemala, confirming its status as a host. The larvae feed in the flowerhead. Flies were either reared from or collected on *B. salicifolia* in Mexico. A single female was swept from *Baccharis neglecta* Britton by Paul Boldt in Mexico, but it is unclear if this plant is also a host.

Material examined. GUATEMALA: Baja Verapaz: San Jeronimo, 1000 m, swept from flowering *Baccharis salicifolia* (90G30), 27–28 Oct 1990, A. L. Norrbom & E. Muñiz, 2♂ 4♀ (USNM); same, reared ex flowers of *Baccharis salicifolia* (90G30), 13♂ 12♀ (USNM), 2♂ 2♀ (UVG). Chimaltenango: Chimaltenango, 19–20 Aug 1965, P. J. Spangler, 3♂ 3♀ (USNM). Huehuetenango: San Idelfonso Ixtahuacan, along river, 15.41551°N 91.76618°W, 1598 m, on *Baccharis salicifolia* (07G61), 24 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, F. Camposeco, 5♂ 12♀ (USNM USNMMENT00671600–16); same, emerged 28 Nov–11 Dec 2007 reared ex flowerheads of *Baccharis salicifolia* (07G61) collected 24 Nov 2007, 8♂ 9♀ (USNM USNMMENT00671459–75), 6♂ 4♀ (FSCA), 1♂ 1♀ (UVG). Quiche: Chichicastenango, 8 km N, 1829 m, 23 Oct 1976, E. S. Ross, 1♂ (CAS). Sololá: Panajachel, 19 Aug 1963, D. Q. Cavagnaro & M. E. Irwin, 2♂ 4♀ (CAS). MEXICO: Chiapas: San Cristobal de Las Casas, 7200 ft., Malaise trap, 10 Jun 1969, 1♀ (CNC). Distrito Federal: Guadalupe Hidalgo, 10 Jul 1932, R. Haag, 1♂ (MCZ); Guadalupe Hidalgo, 7000 ft., 10 Jul 1932, C. E. White, 1♂ 2♀ (MCZ). Durango: San Juan del Río, 5200 ft., 30 Jul 1947, W. Gertsch, 1♂ (AMNH). Guanajuato: Acombaro, 11 mi SW, 17 Aug 1954, J. W. MacSwain, 1♀ (UCB); Guanajuato, 15 Jul 1954, R. F. Smith, 3♂ 2♀ (UCB); Guanajuato, 5 mi. N of, 25 Jul 1954, E. I. Schlinger, 1♂ (UCB). Jalisco: El Tigre, 18 Jul 1954, E. I. Schlinger, 7♂ 1♀ (UCB); Encarnacion de Diaz, 12 mi S, 18 Aug 1953, C. & P. Vaurie, 1♂ 1♀ (AMNH); Huentitan el Bajo, Parque el Mirador, 5 Sep 1972, B. Villegas, 1♀ (UCD); La Quemada, 20 mi N, 27 Jul 1954, M. Cazier, W. Gertsch, Bradts, 1♂ (AMNH); Teocaltiche, Rancho La Quinta, 5600 ft., 25 Aug 1979, B. Villegas, 6♂ 9♀ (UCD); Zapopan, Sep 1965, N. L. H. Krauss, 1♂ (USNM). México: Real de Arriba, Temescaltepec, 22 May 1933, H. E. Hinton & R. L. Usinger, 2♂ 2♀ (CAS). Michoacán: San Jose Purua, Jun 1965, N. L. H. Krauss, 1m (USNM); Uruapan, 1600–1700 m, Aug 1975, N. L. H. Krauss, 6♂ 2♀ (USNM). Nayarit: Ahuacatlan, 14 Sep 1970, G.E. & R.M. Bohart, 1♂ 1♀ (USU); Tepic, 15–17 Sep 1953, B. Malkin, 1♀ (CAS). Oaxaca: Oaxaca, 8 Jul 1952, E. E. Gilbert & C. D. MacNeil, 1♀ (UCB); Oaxaca, 17°02'N 96°40'W, *Baccharis salicifolia*, 9 Aug 1987, W. A. Palmer, 2♂ 1♀ (USNM). San Luis Potosí: San Luis Potosi, 4 mi W,

25 Jun 1953, C. & P. Vaurie, 1♀ (AMNH). Sinaloa: Lorenzo, S of, 11 Sep 1970, G. E. & R. M. Bohart, 1♀ (USU). Sonora: Alamos, on *Baccharis*, 7 Sep 1970, G. E. & R. M. Bohart, 5♂ 2♀ (USU); Alamos, 3–4 Sep 1991, T. Griswold, 1♂ (USU). Veracruz: Balasterra, on foliage *Lantana hispida*, 3 Sep 1989, K. R. Pullen, 1♂ (USNM). Zacatecas: Fresnillo, 9 mi S, 10 Aug 1954, E.G. Linsley, 1♀ (UCB); Nochistlan, 6500 ft., 21 Aug 1979, B. Villegas, 3♂ 12♀ (UCD); Nochistlan, 22 Sep 1975, B. Villegas, 1♂ 4♀ (UCD); Río Grande, 5800 ft., 19 Aug 1979, B. Villegas, 2♂ 1♀ (UCD); Zacatecas, 55 mi NW, Hwy. 45, sweeping *Baccharis neglecta*, 3 Aug 1988, P. E. Boldt, 1♀ (USNM).

***Homoeothrix aberrans* (Schiner), new combination**

Oxyphora aberrans Schiner 1868: 273.

Neotephritis aberrans: Hering 1947: 6.

Oxyphora aberrans Schiner, currently classified in *Neotephritis* Hendel (Norrbom et al. 1999), is here transferred to *Homoeothrix* Hering. It and *H. lindigi* (Hendel), the only previously included species, differ from *Neotephritis* in having the lateral vertical seta dark brown to black, acuminate, and similar in color and shape and more than half as long as the medial vertical seta; both orbital setae black (posterior seta not whitish and paler than anterior seta as in *Neotephritis*); and vein R_{4+5} with numerous long setulae ventrally to well beyond level of crossvein dm-cu (in *Neotephritis* R_{4+5} is bare ventrally or has a few short setulae proximal to the level of dm-cu, most or all of them usually proximal to r-m). The male terminalia of the two species of *Homoeothrix* are also very similar (Figs. 40–41). The lateral surstylus has a large, triangular posterodorsal lobe, the ventral surface of which is densely setulose, the setulae projecting posteriorly. In examined species of *Neotephritis* the lobe is not nearly so large nor as densely setulose.

The two species of *Homoeothrix* differ in the shape and color of the posterior notopleural seta. In *H. aberrans* it is whitish and lanceolate, whereas in *H. lindigi* it may be slightly paler brownish, but is acuminate.

Species of *Homoeothrix* are so far known only from high elevation (>2500 m altitude), páramo areas of Venezuela and Colombia. Specimens in the USNM collection that are *H. lindigi* or a very similar species were reared from *Espeletia grandiflora* Bonpl. and *Ruilopezia floccosa* (Standl.) Cuatr. (Asteraceae: Heliantheae: Milleriinae).

***Lamproxynella* Hering**

The closely related genera *Dyseuaresta* Hendel, *Lamproxynella* Hering, and *Pseudoedaspis* Hendel need revision and the classification of their species should be reconsidered based on a phylogenetic analysis. At least based on their wing patterns, *D. fuscoapicalis* Hering, 1942, and *Acinia impluviata* Blanchard, 1852 (Fig. 47), appear to be better placed in *Lamproxynella*, which have reticulate or banded patterns, than in *Dyseuaresta*, which usually have radiate to stellate patterns. They are hereby transferred from *Dyseuaresta* to *Lamproxynella*. The only known host plant of *L. impluviata* is a species of *Senecio* (Asteraceae: Senecioneae) (Frias 1992), a genus that is attacked by at least two other species of *Lamproxynella*, whereas most known hosts for *Dyseuaresta* species are in the tribe Heliantheae (Prado et al. 2002; Norrbom, unpubl. data).

***Neosphaeniscus* Norrbom, new genus**

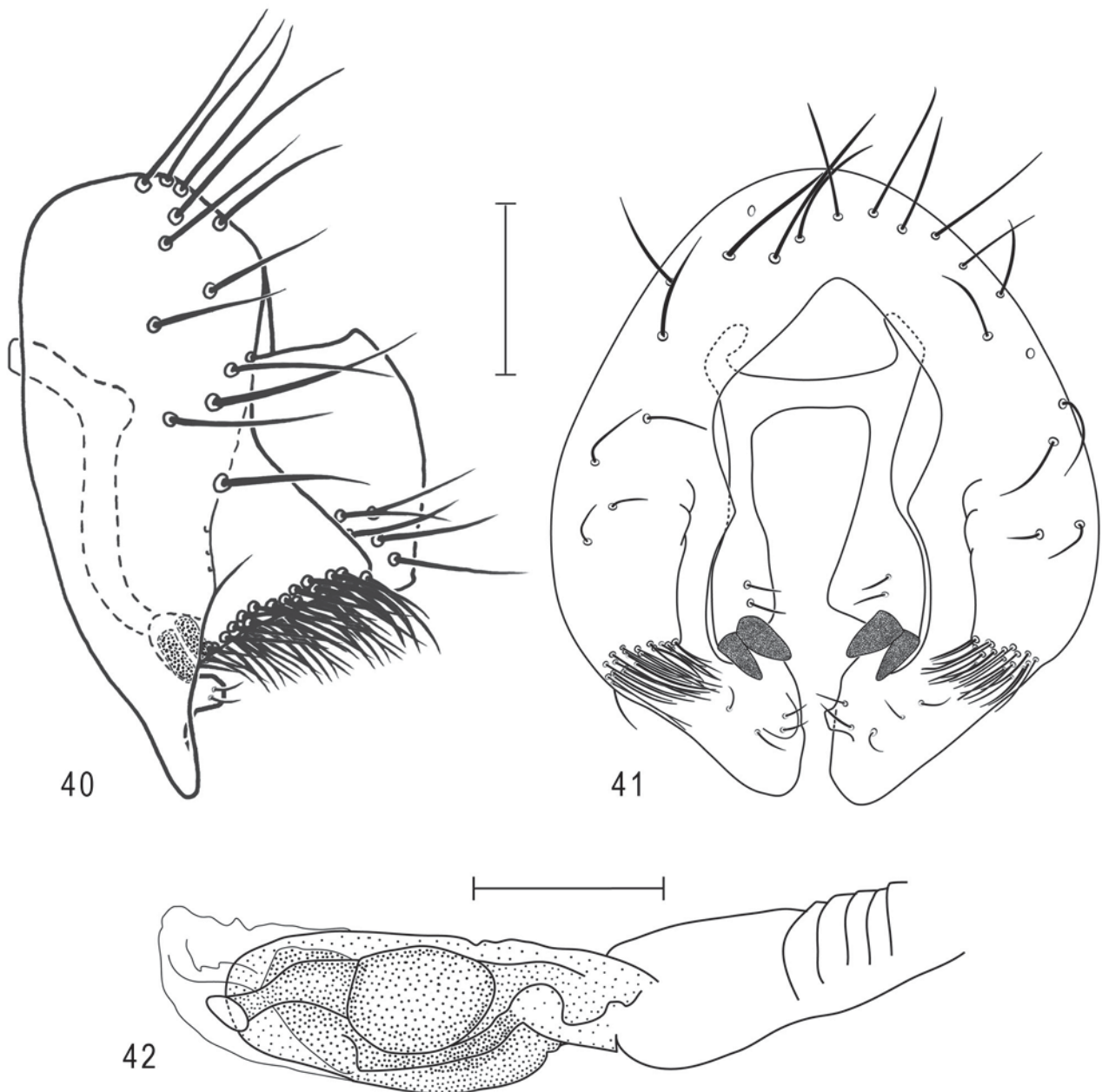
Type species: *Euribia m-nigrum* Hendel 1914: 68.

Diagnosis. This genus includes *N. m-nigrum* (Hendel), **new combination**, *N. flexuosus* (Bigot), **new combination**, and two or three other, probably undescribed species. Malloch (1933: 265) placed the species originally described as *Urophora flexuosa* Bigot (1857: 305) in *Metasphenisca*, but that genus belongs in the tribe Tephrellini, which does not occur in the New World. *Neosphaeniscus* species do not have extremely narrow

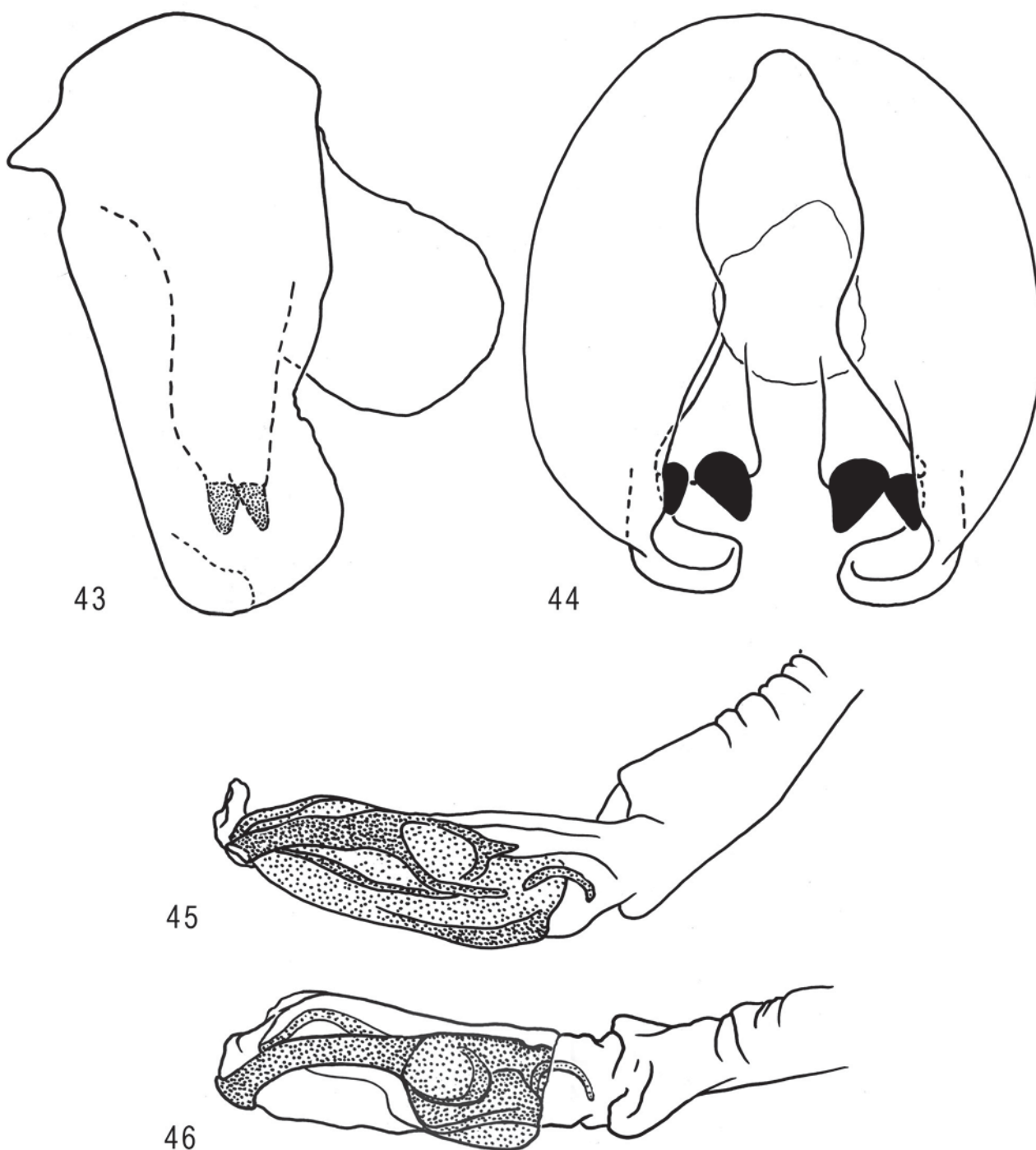
aculei as in *Metasphenisca* and most other Tephrellini. They superficially resemble *Pseudoedaspis* in wing pattern, but are easily distinguished by the number of scutellar and frontal bristles and the much different male genitalia (they do not have elongate, strongly curved surstyli as in *Pseudoedaspis*). *Neosphaeniscus* differs from *Lewinsohnia*, *Homoeothrix*, and *Neotephritis*, other New World genera of Tephritini with three frontal setae and two scutellar setae, by its wing pattern, which is banded or nearly so (Figs. 48–49), and its abdominal vestiture. In *Neosphaeniscus* at least male tergite 5 or female tergite 6 has a large shiny nonmicrotrichose area, whereas in the other genera the abdominal tergites are entirely microtrichose, matte.

Description. Setae yellow to pale brown, setulae, especially on thorax and abdomen, mostly whitish lanceolate.

Head: Higher than long, yellow. Frons 1.5–2.0 times as wide as eye, setulose medially, with 3 frontal and 2 orbital setae. Ocellar seta well developed. Posterior orbital, postocellar, postvertical, and lateral vertical setae whitish, lanceolate. Postocular setae mixed small and large whitish lanceolate. Proboscis capitate, palpus slender. Antenna short, arista minutely pubescent.



FIGURES 40–42. Male terminalia, *Homoeothrix lindigi* (Colombia: Bogota, USNM00213122): 40–41, epandrium and surstyli, lateral and posterior; 42, glans, dorsal.



FIGURES 43–46. Terminalia, *Neospheniscus flexuosus* (Chile: Cordillera Terma de Colina): 43–44, epandrium and surstyli, lateral and posterior; 45–46, glans, lateral and dorsal.

Thorax: Mostly to entirely dark brown, densely grayish to yellowish microtrichose. Scutum, scutellum, anepisternum, anepimeron, and katepisternum setulose. Postpronotal, 2 notopleural, pre- and postsutural supra-alar, intra-alar, postalar, acrostichal, dorsocentral, 2 scutellar, 1–2 anepisternal, 1 anepimeral, and 1 katepisternal setae present. Dorsocentral seta midway between transverse suture and postsutural supra-alar seta or closer to suture. Apical scutellar seta slightly more than half as long as basal scutellar seta.

Legs: Yellow, femora sometimes partially or mostly dark brown. Hind femur with preapical anterodorsal and posterodorsal setae.



FIGURES 47–56. Wings: 47, *Lamproxynella impluviata* (Chile: Estero Tilt, USNMENT00049165); 48, *Neosphaenicus m-nigrum* (Argentina: 3 km N Puerto Lobos); 49, *N. flexuosus* (Chile: Cordillera Termas de Colina); 50, *Paracantha gentilis* (Mexico: 2 km W San Juan Chamula); 51, *Paracantha multipuncta* (Chile: Camina Iquique); 52, *Paracantha ruficallosa* (Costa Rica: SE Rio Naranjo, USNMENT00213174); 53, *P. trinotata* (Mexico: Lagunas de Zempoala); 54, *Phacelochaeta obliqua* (Ecuador: El Tambo, USNMENT00213090); 55, *P. quinquefasciata* (Peru: Cuzco, USNMENT00213096); 56, *P. quinquevittata* (Ecuador: Danas, USNMENT00213086).

Wing (Figs. 48–49): With dark brown bands, including: small band on crossvein h; band from pterostigma to vein Cu_2 , connected in pterostigma and cell R_{2+3} to posteriorly forked band covering r-m, apex of vein Cu_1 ,

and middle of cell cu_1 ; subapical band (covering $dm-cu$), connected anteriorly with marginal band from apex of cell r_1 to apex of vein M, and sometimes with 1–2 bands or marks across cells r_{4+5} and m. Vein R_{2+3} nonsetulose dorsally and ventrally; vein R_{4+5} nonsetulose or at most with 1–2 dorsal setulae proximal to r-m.

Abdomen: Dark brown, densely microtrichose except terminal (male 5th, female 6th) tergite partly shiny, nonmicrotrichose.

Male terminalia: Lateral surstylus short, strongly medially curved (Figs. 43–44). Medial surstylus short, with 2 stout prenisetae. Phallus without spinules proximal to glans; glans (Figs. 45–46) short, mostly sclerotized, with slightly curved acrophallus.

Female terminalia: Oviscape shiny, nonmicrotrichose. Aculeus gradually tapering to simple apex.

Distribution. *Neosphaeniscus* is known from Argentina and Chile.

Etymology. The name of this genus is derived from the genus *Sphaeniscus*, which has a superficially similar wing pattern, and the prefix *Neo-*, referring to its Neotropical distribution. It is masculine in gender.

Oedicarena beameri Norrbom & Ming

Distribution. USA (Arizona) and Mexico (Chihuahua). The following record is only the second known locality for this species and the first from Mexico.

Material examined. MEXICO: Chihuahua: Cusare, 3 km S of, 27°35.43'N 107°31.249'W, 29 Aug 2005, D. G. Furth, 2♂ (USNM USNMENT00212909–10).

Oedicarena latifrons (Wulp)

Biology. This species breeds in fruit of *Solanum stoloniferum* Schltdl. & Bouché (= *S. fendleri* Gray) in New Mexico and *S. iopetalum* (Bitter) Hawkes (= *S. brachycarpum* (Correll) Correll) in central Mexico. Additional distribution records are also listed below.

Material examined. MEXICO: Chihuahua: Cusare, 3 km S of, 27°35.43'N 107°31.249'W, 29 Aug 2005, D. G. Furth, 2♂ (USNM USNMENT00212912–13). Distrito Federal: La Cima, 1 km N of, on Rt. 95 (libre), Km 42–43, near train overpass [19°7'N 99°12'W], swept from *S. iopetalum* [label as *Solanum brachycarpum* Correll], 8 Aug 1989, A. L. Norrbom, 1♂ (IEXV). MEXICO: Michoacán: Angangueo [19°37'N 100°18'W], 2–4 km N of, 4–5 Oct 1991, A. L. Norrbom, 1f (IEXV). Morelos: Lagunas de Zempoala [19°2'58"N 99°19'3"W], clearing at entrance, swept from *Solanum iopetalum* [label as *Solanum brachycarpum* Correll] (89M4), 9–11 Aug 1989, A. L. Norrbom, 1♀ (IEXV) 1♂ 2♀ (USNM USNMENT00215328–30); emerged 21 Sep 1990, reared ex fruit of *Solanum iopetalum* [label as *Solanum brachycarpum* Correll] (89M4) collected 9–11 Aug 1989, A. L. Norrbom, 1♀ (USNM USNMENT00050349); Lago Zempoala, 6 km W of, on Rt. 890, Km 9 [19°4'N 99°20'W], reared ex fruit of *Solanum iopetalum* [label as *Solanum brachycarpum* Correll] (91M14B), 2 Oct 1991, A. L. Norrbom, 3♂ (IEXV) 2♂ 1♀ (USNM USNMENT00215324–26). UNITED STATES: New Mexico: Otero Co., Cloudcroft, grassy lot along main street, emerged Jul 1996 reared ex fruit of *Solanum stoloniferum* Schltdl. & Bouché [label as *Solanum fendleri* Gray] (BAM21) collected 25 Sep 1995, J. M. Bamberg, 1♂ (USNM USNMENT00215321).

Ostracocoelia mirabilis Giglio-Tos

Ostracocoelia mirabilis Giglio-Tos 1893: 11 (Type ♀ (IMZ), Mexico; not examined).

Ceratitoedaspis palpalis Aczél 1953: 111 (Holotype ♂ (USNM), Guatemala: Yepocapa; examined). **New synonymy.**

Ostracocoelia palpalis: Foote 1980: 39.

Ceratitoedaspis palpalis Aczél is here considered a new junior synonym of *O. mirabilis* Giglio-Tos. Among the examined specimens there is variation in the size of the nonmicrotrichose shiny area on the anepisternum (generally smaller in Mexican specimens), the color of the anepisternal setulae (paler in some Mexican specimens), the size of the subapical marginal hyaline spot in cell r_{2+3} , and the subapical hyaline markings of cell

r_{4+5} (usually absent or minute; longer and isolated in the two Chiapas specimens; connected to marginal spot in cell r_{2+3} in one female from Zurquí, Costa Rica, which also has a tiny apical marginal spot in r_{4+5}), but all of these characters intergrade and all of the specimens examined appear to be conspecific.

Biology. One male was reared from an elongate, tapered stem gall on *Ageratina maireriana* (DC.) R.M. King & H. Rob. (Asteraceae: Eupatorieae) at Anganguero, Michoacán, Mexico and a similar gall from which an adult had already eclosed was found near Huitzilac, Morelos. Noel Krauss also reared two adults of this species from stem galls on an undetermined plant in Morelos.

Material examined. COSTA RICA: [unspecified locality], 1920, P. Serre, 1♀ (MNHNP). Guanacaste: Parque Nacional Guanacaste, SW side Volcan Cacao, Estación Cacao, LN 323300 375700, 1000–1400 m, Sep 1989, R. Blanco & C. Chaves, 1♂ (INBio INBioCRI000027227); W side Volcan Orosi, Estación Maritza, LN 326900 373000, 600 m, Aug 1990, 1♂ (INBio INBioCRI000253548); 9 km S of Santa Cecilia, Estación Pitilla, LN 330200 380200, 700 m, 24 Aug–11 Sep 1992, P. Rios, 1♀ (INBio INBioCRI000831958); 6 km S Santa Cecilia, Finca Laoiciga, LN 332400 380400, 500 m, 6–28 Jan 1992, P. Rios, 1♂ (INBio INBioCRI001111267); Río Naranjo, 3 km SE of [10°40'N 85°4'W], 16–31 Aug 1993, F. D. Parker, 1♀ (USU USNMENT00213119); same, 20–29 Nov. 1991, 1♀ (USU USNMENT00213120). San José: Zurquí de Moravia, 10°3'N 84°1'W, 1600 m, Malaise trap, May 1992, P. Hanson, 2♂ 1♀ (USNM USNMENT00213282–84); same, Aug 1995, 2♀ (USNM USNMENT00048618, USNMENT00048629), 1♂ 1♀ (UCRSJ USNMENT00048623, USNMENT00048630); same, Dec 1995, 1♀ (INBio). GUATEMALA: Chimaltenango: Yepocapa, Aug 1949, H. T. Dalmat, ♂ holotype of *Ceratitoedaspis palpalis* (USNM USNMENT00213109); Huehuetenango: Sierra los Cuchumatanes, Aquacatán, ~3.75 km NE of, 15.36845°N 91.28866°W, 2210 m, oak forest, ovipositing on possibly *Ageratina* sp., 6–8 Jun 2009, G. J. Steck, B. D. Sutton & J. Monzón, 1♀ (FSCA). MEXICO: Chiapas: Teopisca, 10 mi. E of, 2 May 1969, J. E. H. Martin, 1♂ (CNC USNMENT00213117); Tuxtla Gutierrez, 1000 ft., 3 May 1959, H. E. Evans, 1♂ (CUI USNMENT00212829). Chihuahua: Sierra Madre Occidental, La Bufa, 4 Jul 1972, D. Giuliani, 1♂ (CAS USNMENT00213110). Distrito Federal: Mexico City, May 1917, R. Muller, 1♂ (USNM USNMENT00213112). Michoacán: Anganguero [19°37'N 100°18'W], 2–4 km N of, emerged 20 Apr 1992 reared ex elongate stem gall on *Ageratina maireriana* (91M40) coll. 4–5 Sep 1991, A. L. Norrbom, 1♂ with gall (USNM USNMENT00213118). Morelos: Amecuzac, 5 km SW of, 1030 m, 21 Jun 1979, J. Butze, 1♂ (CNC USNMENT00213115); Cuernavaca, Jun 1945, N. L. H. Krauss 348, 1♀ with puparium (USNM USNMENT00213114); same, emerged May 1945 ex stem gall on undetermined plant collected Oct 1944, N. L. H. Krauss 276, 1♂ with puparium in opened gall (USNM USNMENT00213113); Rt. 95 (libre), junction of road to Huitzilac (near Km 65) [19°0'N 99°15'30"W], ex elongate stem gall on *Ageratina maireriana* (91M19), 24 Sep 1991, A. L. Norrbom, 1 puparium in gall (USNM USNMENT00213108). Oaxaca: Tejo-cates, Rt. 190, Km 491, 4 Aug 1965, Flint & Ortiz, 1♀ (USNM USNMENT00213116). Sinaloa: 36.6 mi. NE of Villa Union, near La Capilla Detaxte, 2 Jul 1982, 1♂ (USNM USNMENT00213111).

Paracantha Coquillett

Paracantha Coquillett 1899 (type species *Trypeta culta* Wiedemann, by original designation).

Neorhabdochaeta Malloch 1941 (type species *N. anduzei* Malloch, by original designation, = *P. ruficallosa* Hering); Norrbom *et al.* (1999: 180) (synonymy).

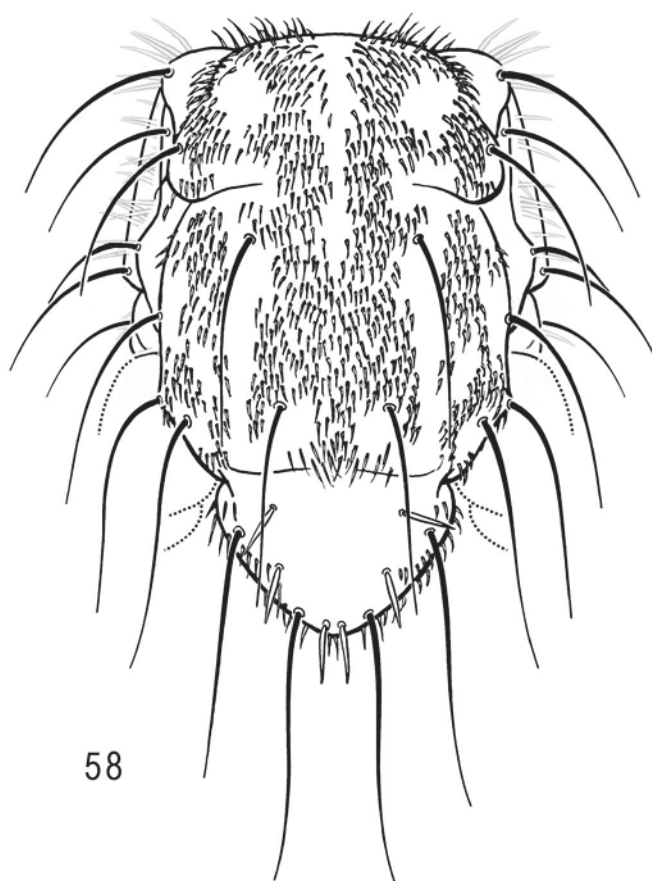
Laksyetsa Foote 1978 (type species *L. trinotata* Foote, by original designation). **New synonymy.**

The monotypic genus *Laksyetsa* Foote is here considered a subjective junior synonym of *Paracantha* Coquillett, as is *Neorhabdochaeta* Malloch, which was placed in synonymy with *Paracantha* by Norrbom *et al.* (1999).

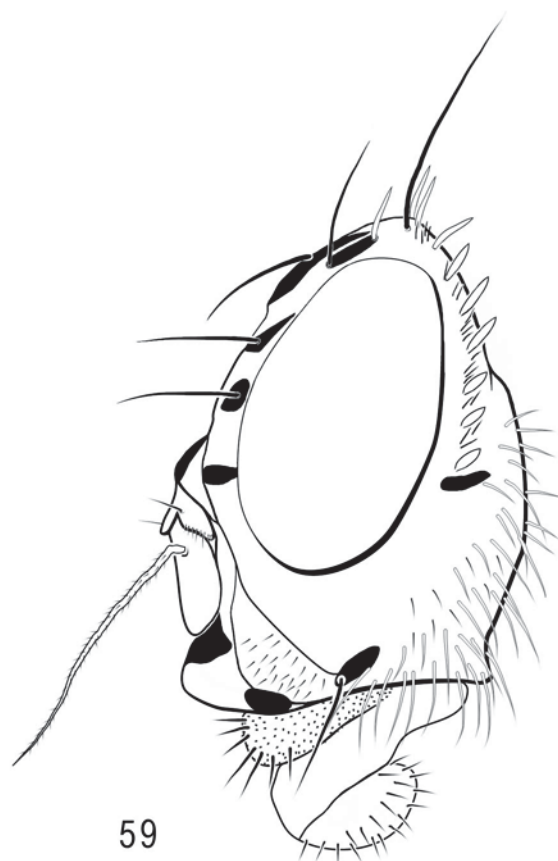
Paracantha occurs from Canada to Argentina and Chile and includes 11 described and at least two undescribed species, which breed in flowerheads of various Asteraceae, including thistles, *Cirsium* spp. (Cardueae), *Dahlia* (Coreopsidae), *Calea* (Neurolaeneae), and sunflowers and related genera, such as *Borrchia*, *Helianthus*, and *Viguiera* (Heliantheae) (Foote *et al.* 1993, Prado *et al.* 2002).



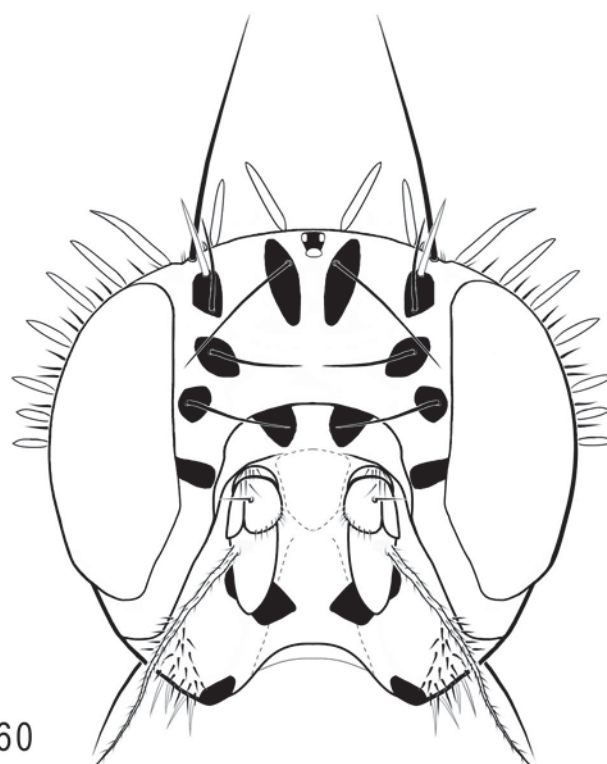
57



58



59



60

FIGURES 57–60. *Paracantha gentilis* (USA: Mary's Peak, USNMENT00104452): 57, head, anterolateral; 58, thorax, dorsal; *Rachiptera* sp. (Chile: Cuesta La Dormida, USNMENT00049904): 59–60, head, lateral and anterior.

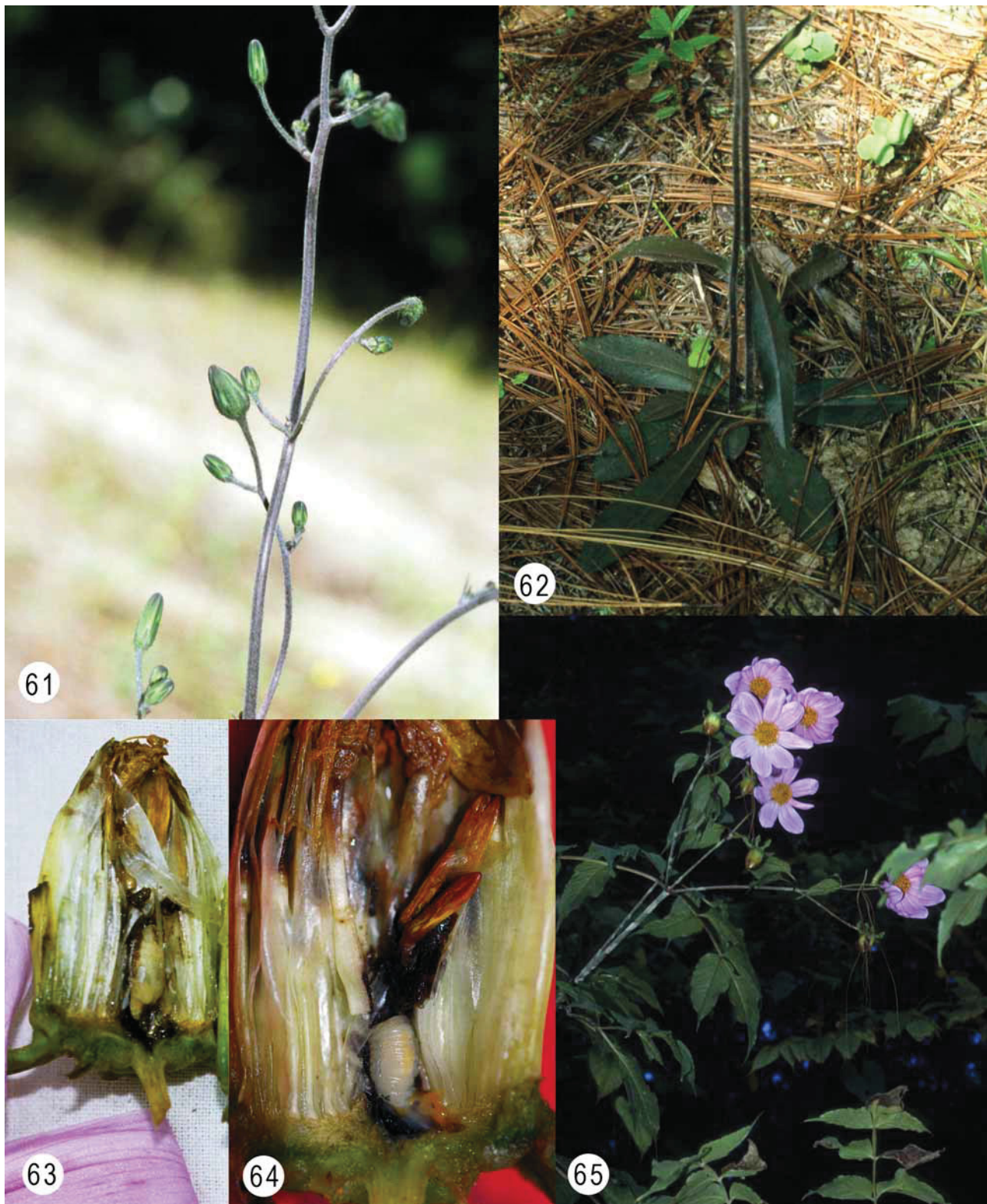
Paracantha is most closely related to *Rachiptera* Bigot, as indicated by the following two synapomorphies: Face, lunule, and frons (Figs. 57, 59–60, 102, 105) shiny yellow, mostly nonmicrotrichose, with blackish spots, including parafacial spot at level of base of antenna and 1–4 spots on face; eyes (Fig. 57) with two rows of four irregular red spots, sometimes narrowly connected, on green background (pattern often faded or absent after death). Some Schistopterini and other Eutretini have patterned eyes, but the markings are different (e.g., in many species of *Eutreta*, the eye has three green medial stripes on a red background).

Although the type species of *Neorhabdochaeta* and *Laksyetsa* each have a number of distinctive characters, it is questionable whether the remaining species of *Paracantha* form a monophyletic group without including them. An undescribed species (n. sp. B) most closely related to *P. ruficallosa* shares some, but not all of the apomorphic characters of *P. ruficallosa*. At least one apomorphy (anterior orbital seta anterior to posterior frontal seta) supports the hypothesis of closer relationship of the species exclusive of *P. trinotata*, whereas another (bullae in cell r_{4+5} with dark brown medial spot) suggests that *P. trinotata* is more closely related to the species exclusive of *P. ruficallosa* and n. sp. B.

The following synapomorphies support the monophyly of *Paracantha* (including *P. trinotata*):

- 1) Frons (Fig. 57) usually with three or more pairs of orbital setae, all of which are white (2–3 in *P. trinotata*, posterior seta occasionally brown; plesiomorphic state (as in *Rachiptera* and most other Tephritinae)—2 setae, at least anterior seta dark). A few Dithrycini and an undescribed species of *Dictyotrypeta* have three setae, with the anterior seta brown, but the above combination is unique to *Paracantha*.
- 2) Scutellum (Figs. 58, 103) with three or more pairs of erect white setae in a nearly pentagonal arrangement, the more proximal two pairs located on the disc distinctly medial to the basal pair of normal marginal setae. The proximal pair are sometimes smaller than the two more apical pairs, which are usually subequal. Many species of Schistopterini (Freidberg 2002) as well as some Noeetini have erect scutellar setae, but their number, size, and arrangement vary. The proximal two pairs, if present, are often smaller than the subapical setae or are near the margin or irregularly arranged on the disc, whereas they are consistent in position in *Paracantha*. The presence of erect setae may be a synapomorphy at some higher level, but their number and location on the disc is a synapomorphy of *Paracantha* species. *Rachiptera* do not have erect setae on the scutellum.
- 3) Wing (Figs. 50–53) with three bullae, one in cell r_{2+3} well basal to r-m, one in cell dm slightly basal to r-m (usually poorly differentiated in *P. trinotata*), and one in cell r_{4+5} anterior to dm-cu. They are weak or sometimes absent in *P. ruficallosa* Hering. This combination of bullae is a synapomorphy of *Paracantha* species. Various Tephritinae have a bulla in cell r_{4+5} , and at least some species of *Rhabdochaeta* and *Schistopterum* have bullae in cells r_{2+3} , dm and r_{4+5} , but at least in the species we have examined they are closer together than in *Paracantha*, with the one in r_{4+5} aligned with or proximal to dm-cu. Other Schistopterini, such as *Rhochmopterum* Speiser and *Bactropota* Bezzi, lack them, as do *Rachiptera* species. This character may also have some phylogenetic significance at a higher level, but the position of the bullae is a probable synapomorphy for *Paracantha*.
- 4) Face with 1–4 dark brown spots, including medial spot near midheight and often 2–3 spots on ventral margin (Fig. 57). In *Rachiptera* (Fig. 60) the face has 2 or 4 dark brown spots, but lacks a medial spot near midheight.
- 5) The egg of *P. trinotata* is similar to those of the four species for which the egg has been described previously, *P. culta* (Wiedemann), *P. cultaris* (Coquillett), *P. forficula* Benjamin, and *P. gentilis* Hering (Benjamin 1934, Cavender & Goeden 1984, Headrick & Goeden 1990), in having an elongate, slender lobe on the micropyle end. The lobe is absent in *Rachiptera limbata* Bigot (Frías 2008) suggesting that it is a synapomorphy of *Paracantha* species, although it should also be noted that clearly unrelated tephritid species such as *Aciurina ferruginea* (Doane) and some species of *Chaetorellia* and *Craspedoxantha* have a similar elongate lobe on the egg (Tauber & Tauber 1967, White & Marquardt 1989, Freidberg 1985).
- 6) *Paracantha* species, except *P. trinotata*, have a radiate wing pattern, with at least some of the rays broad and orange with dark borders (Figs. 50–52). In Schistopterini and other Eutretini (some *Dictyotrypeta* spp.) that have radiate patterns the rays are generally narrow, and are entirely dark or may contain hyaline spots. *Rachiptera* species have reticulate wings, except in *R. parallela* (Hendel) the anterior margin has

short, irregular rays (Fig. 105). It is unclear whether the radiate pattern in *Paracantha* is a synapomorphy for the species other than *trinotata*, or for all of them if the pattern in *P. trinotata* was derived from it. The hyaline areas between the rays vary considerably in size within *Paracantha* and in some species (e.g., *P. multipuncta* Malloch (Fig. 51)) are relatively small, especially in cells r_{2+3} , r_{4+5} and m , intermediate between *P. trinotata* (Fig. 53) and other *Paracantha* (Figs. 50, 52), suggesting the latter hypothesis.



FIGURES 61–65. Host plants: *Hieracium abscissum*, host of *Acidogona stecki*: 61, partial inflorescence with infested unopened capitula; 62, basal leaves; *Dahlia imperialis*, host of *Paracantha trinotata*: 63, opened capitulum with pupa; 64, opened capitulum with larva; 65, inflorescence.

***Paracantha trinotata* (Foote), new combination**

Figs. 53, 63–64, 102

Laksyetsa trinotata Foote 1978: 29.

Biology. The only previously reported host plant is *Dahlia tenuicaulis* Sorenson (Foote 1978). We also reared it from *D. imperialis* Roetzl (Asteraceae: Coreopsidae) (Fig. 65) in Mexico and Guatemala. The larvae feed and pupate in the capitulum (Fig. 63–64).

Distribution. Mexico (Durango, Morelos, Oaxaca) and Guatemala. Previously known only from mountainous areas in Mexico, including the Sierra Madre Occidental (Durango), the transverse volcanic belt (Morelos), and the Sierra Madre del Sur (Oaxaca), *P. trinotata* also occurs in highland areas of Guatemala (Jalapa, Sacatepéquez, Totonicapán).

Material examined. GUATEMALA: Jalapa: Jalapa - Mataquescuintla Road, 14.57766°N 90.09416°W, 2210 m, emerged 17 Dec 2007 reared ex flowerheads of *Dahlia imperialis* collected 21 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 1♂ (FSCA), 2♂ (USNM USNMMENT00671280–81). Sacatepéquez: Cerro Carmona, Finca El Pilar, lower road, 14.54031°N 90.7066°W, 2265 m, emerged 9 Dec 2008 reared ex flowerheads of *Dahlia imperialis* (07G05A) collected 12 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, 1♀ (FSCA), 1♂ 1♀ (USNM USNMMENT00671278–79). Totonicapán: Hwy. CA-1 8.5 km (air) N Pologuá, 15.11712°N 91.52301°W, 2434 m, emerged 14–21 Dec 2007 reared ex flowerheads of *Dahlia imperialis* collected 23 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 2♂ 2♀ (FSCA), 4♂ 3♀ (USNM USNMMENT00671304–11); Hwy. CA-1, km 209, 2 km NNE of Pologuá (air), 15.05858°N 91.49648°W, 2761 m, emerged 12–20 Dec 2007 reared ex flowerheads of *Dahlia imperialis* (07G57) collected 23 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 7♂ 3♀ (FSCA), 1♂ 1♀ (UVG), 9♂ 10♀ (USNM USNMMENT00671282–300). MEXICO: Morelos: Lagunas de Zempoala, 2805 m, 11 Aug 1962, G. L. Bush, 1♀ (MSUL); Lagunas de Zempoala [19°2'58"N 99°19'3"W], on *Dahlia imperialis*, 9–11 Aug 1989, A. L. Norrbom, 2♀ (IEXV USNMMENT00104379–80), 1♂ 4♀ (USNM USNMMENT00104374–78); Lagunas de Zempoala, reared ex capitulum of *Dahlia imperialis* (91M16), 23–25 Sep 1991, A. L. Norrbom, 2♂ 2♀ (IEXV USNMMENT00213345–48), 8♂ 10♀ (USNM USNMMENT00213349–66), 5♂ 5♀ (BMNH, CDFA, MHNG, TAMU, TAU).

***Phacelochaeta* Norrbom, new genus**

Type species: *Procecidochares quinquefasciata* Hendel, 1914.

Diagnosis. This genus includes three species from Ecuador, Peru and Bolivia, one of which is here described. Their biology is unknown, but they occur at relatively high elevations (2800–5000 m). The two previously described species have most recently been classified in the genus *Cecidochares* Bezzi, but do not belong in that genus nor the tribe Cecidocharini (sensu Korneyev 1999). They have the lateral vertical seta white, lanceolate, and less than half as long as the blackish medial vertical seta, the postocular setae mixed small, acuminate and large, lanceolate, and the frons setulose medially (Fig. 70) (see discussion under *Dracontomyia*).

Probable synapomorphies of *Phacelochaeta* include: scutellum (Fig. 70) with 5 marginal clusters of whitish, lanceolate setulae, including one proximal to each basal seta, one on both sides between the basal and apical setae, and an unpaired medial apical cluster between the apical setae (a pair basal to the basal seta occurs in most *Stenopa* and some *Dracontomyia* species and in many Cecidocharini, e.g., *Hetschkomyia*, *Neorhagoletis*, and a few species of *Cecidochares* and *Procecidochares*, but the 3 distal clusters are unique to *Phacelochaeta*); subscutellum with ventral half nonmicrotrichose (also occurs in *Hetschkomyia* and *Neorhagoletis*); wing (Figs. 54–56) with oblique band covering pterostigma and crossveins r-m and dm-cu, r-m displaced distally, distance from bm-cu to r-m along vein M/ distance from bm-cu to dm-cu 0.73–0.76; and surstyli (Figs. 66–67, 75–76) elongate and posteriorly curved (in *Cecidochares* species they are relatively short; Fig. 69).

In wing pattern and venation, species of *Phacelochaeta* superficially resemble *Tomoplagia* Coquillett, but differ from them by the same characters as above. They may be most closely related to *Dracontomyia* and *Stenopa* (see discussion under *Dracontomyia*), which they resemble in mesonotal microtrichia and setulae patterns, having a strongly convex scutellum, and banded wings. They differ from species of those two genera in having crossvein r-m distinctly distal to the midlength of cell dm and in the middle of the same oblique band covering the pterostigma and crossvein dm-cu.

Description. Most major setae blackish; most setulae whitish, lanceolate.

Head: Frons broad; setulose medially. 3 black frontal setae; 2 orbital setae, anterior seta black, posterior seta usually white (variable, sometimes black in *quinquefasciata*). Ocellar setae well developed, black. Postocellar and postvertical setae white, lanceolate. Postocular setae mixed small brown acuminate and large white lanceolate; lateral vertical seta less than half as long as medial vertical seta, white lanceolate. Arista minutely pubescent. Proboscis capitate, labella large and fleshy.

Thorax: With dark brown to black ground color, mostly densely gray to tan microtrichose; posterior margin of scutum, margin of scutellum (ventral to setae) at least laterally, and at least dorsal half of subscutellum densely dark brown microtrichose; small medial area on anterior margin of scutum, entire disk of scutellum, ventral part of subscutellum, and most of mediotergite shiny, nonmicrotrichose. Mesonotal setulae white, lanceolate; nearly evenly distributed on gray or tan area of scutum; blackish posterior area of scutum nonsetulose except for 4 clusters of setulae near posterior margin. Scutellum strongly convex; nonsetulose except 5 clusters of setulae on margin, 1 pair of clusters basal to basal seta, 1 pair between basal and apical setae, and 1 unpaired cluster between apical setae. Anepisternum, anepimeron, and katapisternum setulose. Postpronotal, 2 notopleural, pre- and postsutural supra-alar, intra-alar, postalar, acrostichal, dorsocentral, 2 scutellar, 1-several anepisternal, 1-several anepimeral, and 1 katapisternal setae present. Pleural setae and setulae whitish except katapisternal seta and most dorsal anepisternal seta. Posterior notopleural seta white. Dorsocentral seta very close to transverse suture. Apical scutellar seta 1/3–1/2 as long as basal scutellar seta.

Legs: Entirely yellow to orange brown.

Wing: Costa with marginal setulae at humeral break not enlarged; at subcostal break with 2–3 larger setae. Pattern with base orange brown and 5 transverse to oblique bands, basal area and subbasal band broadly connected in cells c, bm, and bcu. Third band covering pterostigma and crossveins r-m and dm-cu. Crossvein r-m at 0.71–0.77 distance from bm-cu to dm-cu. Vein R_{2+3} nonsetulose dorsally and ventrally; vein R_{4+5} dorsally with a few setulae basally and between r-m and dm-cu, ventrally setulose to level of dm-cu, sometimes interrupted. Vein R_{2+3} relatively straight, slightly sinuous distal to r-m; moderately long, ending considerably distal to level of dm-cu. Cell r_{4+5} more or less parallel-sided, without bulla anterior to dm-cu.

Male terminalia: Surstyli (Figs. 66–67, 75–76) without posterodorsal lobe, elongate, projecting posteriorly at nearly 90° angle to epandrium; lateral surstylus tapering to very slender, acute apex. Medial surstylus closely associated with lateral surstylus, with pair of stout prensisetae. Glans (Figs. 68, 77–78) short and stout, mostly sclerotized, acrophallus with subapical bend.

Female terminalia: Oviscape moderately long, shiny nonmicrotrichose, with setulae acuminate to slightly lanceolate. Eversible membrane (Fig. 72) with paired taenia dorsally and ventrally, denticles simple, decreasing in size posteriorly. Aculeus (Figs. 73–74) relatively narrow, gradually tapering to slightly elongate, blunt apex.

Etymology. The name of this genus is derived from the Greek phakelos (cluster, bundle) and chaite (hair), in reference to the clusters of lanceolate, white setulae on the posterior margin of the scutum and scutellum. It is considered feminine in gender.

Key to species of *Phacelochaeta*

1. Wing (Fig. 55) with apex of vein R_{2+3} touching penultimate band or closer to it than to apical band; apical band broad, its proximal margin straight or convex. Band covering crossvein bm-cu at most slightly broadened posteriorly, well separated from apex of vein A_1+Cu_2 . Oviscape setulae pale brown and fine, distinctly darker and thinner than whitish setulae on tergites 2–6.....*quinquefasciata* (Hendel)

- Wing (Figs. 54, 56) with apex of vein R_{2+3} touching apical band or equidistant between it and penultimate band; apical band narrower, its proximal margin concave. Band covering crossvein $bm-cu$ distinctly broadened posteriorly, extended to apex of vein A_1+Cu_2 . Oviscape setulae yellow, similar in thickness and color to setulae on tergites 2–62
- 2. Apex of vein R_{2+3} ending in or touching apical band (Fig. 54); apical band widely separated from penultimate band along posterior wing margin *obliqua* Norrbom, n. sp.
- Apex of vein R_{2+3} equidistant between apical and penultimate bands (Fig. 56), these bands sometimes narrowly connected along posterior wing margin..... *quinquevittata* (Norrbom)

***Phacelochaeta obliqua* Norrbom, new species**

Figs. 54, 66–68

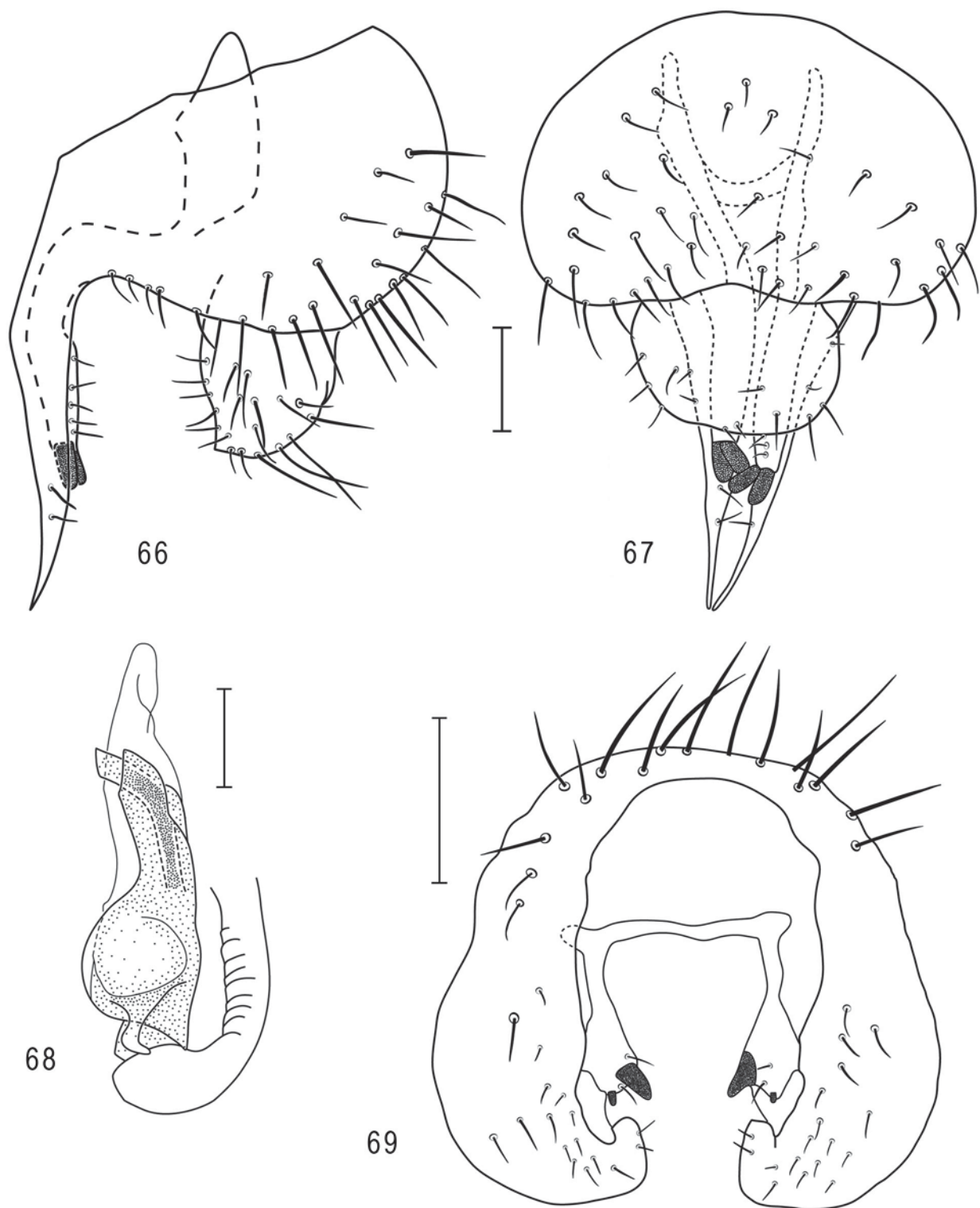
Diagnosis. This species differs from its congeners in having the apical wing band more oblique and touching or extending anteriorly beyond the apex of vein R_{2+3} . The anterior end of the penultimate band is more widely separated from the apex of vein R_{2+3} than in the other two species, but is more narrowly separated from the band crossing the pterostigma. There also is a distinct indentation in cell r_1 in the distal margin of the band through the pterostigma that is weak or not present in the other two species. The lateral surstylus (Figs. 66–67) is longer and more acute than in *P. quinquefasciata* (Figs. 75–76). The male is unknown for *P. quinquevittata*.

Description. Body length, male 4.0 mm, female 5.0–5.5 mm. Mesonotum length 1.80–2.05 mm. Wing length 5.50 mm, width 2.17 mm, ratio 2.53.

Head: Orange except occiput dorsally and ocellar tubercle brown, entirely whitish to grayish microtrichose. Parafacial without brown spot. Frons anteromedially with numerous slender yellow setulae; 3–4 brown, acuminate frontal setae; 2 orbital setae, both acuminate, anterior seta brown, posterior seta yellow; ocellar and medial vertical setae well developed, brown; lateral vertical seta lanceolate, yellow, ca. 1/3 as long as medial vertical seta; postocellar and paraverticlar setae yellow, lanceolate; postocular setae mixed minute, brown, acuminate and large, yellow, lanceolate; genal seta brown; postgenal setulae numerous, large, yellow, acuminate. Facial ridge relatively broad, with numerous proclinate slender yellow setulae.

Thorax: Dark brown except postpronotal lobe mostly orange; mostly densely microtrichose. Mesonotum grayish microtrichose; posterior margin of scutum with irregular dark brown microtrichose area with 2 pairs of broad angular lobes extended anteriorly, 1 to acrostichal seta and 1 almost to intra-alar seta. Scutellum very strongly convex; shiny, nonmicrotrichose except basolateral corner, extreme apical margin, and underside dark brown microtrichose. Subscutellum dark brown microtrichose on dorsal half, shiny, nonmicrotrichose ventrally. Mediotergite shiny, nonmicrotrichose except extreme dorsolateral corner grayish microtrichose, and sometimes with small, sparser, more ventral, lateral or sublateral microtrichose area. Pleuron entirely grayish microtrichose including anepisternum and katepisternum. Thoracic setae long, dark brown, and acuminate, including postpronotal, anterior notopleural, presutural and postsutural supra-alar, dorsocentral, acrostichal, intra-alar, postalar, 2 scutellar, 1 anepisternal, and katepisternal setae. Anepimeral and other anepisternal setae yellow. Posterior notopleural seta yellow, lanceolate, less than half as long as anterior notopleural. Dorsocentral seta aligned very close to transverse suture, much closer to it than level of postsutural supra-alar seta. Scutal setulae yellow, lanceolate, more or less evenly distributed in irregular rows on gray microtrichose areas; without setulae on posterior dark brown microtrichose area except 2 pairs of tight clusters of 5–10 setulae near posterior margin, 1 slightly medial to acrostichal line, 1 anterior to corner of scutellum. Scutellum with 5 clusters of yellow, lanceolate setulae, 1 pair proximal to basal seta, 1 pair on margin between basal and apical setae, and 1 unpaired cluster on margin between apical setae.

Wing (Fig. 54): Costa with 3–4 setae at subcostal break 2–4 times as large as other costal setulae. Pterostigma 0.57 times as long as cell c , subtriangular; vein R_1 gradually curved. Vein R_{2+3} moderately long, distance between apices of R_1 and R_{2+3} / distance between apices of R_{2+3} and R_{4+5} : 1.68. Crossvein $r-m$ 0.73 distance from $bm-cu$ to $dm-cu$. Wing pattern with 5 orange and moderate brown bands. Wing base, including cells bc and extreme base of cell br orange, extending into cells c , bm , and bcu and connecting with first band.



FIGURES 66–69. *Phacelochaeta obliqua* (Ecuador: El Tambo, USNMENT00213089): 66–67, epandrium and surstyli, lateral and posterior; 68, glans, dorsal; *Procecidochares suttoni* (Guatemala: Santa Cruz - San Lorenzo road, USNMENT00671424): 69, epandrium and surstyli, posterior.

First band extending from costal margin in distal half of cell c to posterior margin in anal lobe, covering cross-vein $bm-cu_1$; distinctly broadened posteriorly, extended distally beyond apex of vein A_1+Cu_2 . Second band broadly connected to first band in cells br and dm, extending obliquely to posterior margin in cell cu_1 . Third band connected to first band from costal margin to vein R_{2+3} , extending from pterostigma to posterior margin

in base of cell m, touching or including apex of vein Cu₁, covering crossveins r-m and dm-cu; in cell r₁ distal margin perpendicular to costa, distinctly concave. Fourth band very broad in middle of cell r₁, well separated from apex of cell, with or without 1 small marginal hyaline spot within it; separate from fifth band, broadly separate on posterior margin. Fifth (apical) band elongate and narrow, extended to apex of vein R₂₊₃ or into cell r₁, separated from fourth band by slightly concave hyaline band, without hyaline marginal marks.

Abdomen: Tergites dark brown except lateral margin of syntergite 1+2; mostly moderately densely grayish microtrichose; male tergite 5, except extreme basal margin, and female tergite 6, except extreme basal and lateral margins, shiny nonmicrotrichose. Sternites yellow. Setulae whitish, lanceolate.

Male terminalia: Epandrium brown, shiny nonmicrotrichose. Lateral surstylus (Figs. 66–67) tapering to very slender, acute apex, extending beyond apex of medial surstylus by 2.5 times length of prenisetae. Glans (Fig. 68) similar to that of *P. quinquefasciata*. Female terminalia: Oviscape 1.3 mm long, 0.63 times as long as mesonotum, shiny nonmicrotrichose, with setulae yellow, slightly lanceolate.

Type data. Holotype ♂ (CNC USNMENT00213089), ECUADOR: Cañar: El Tambo, 2800 m, 4–7 Mar 1965, L. E. Peña. Paratypes, same data as holotype, 1 ♀ (CNC USNMENT00213088), 1 ♀ (USNM USNMENT00213090).

Etymology. The name of this species is a Latin adjective referring to its slanted apical wing band.

Phacelochaeta quinquefasciata (Hendel), new combination

Figs. 55, 70–79

Procecidochares quinquefasciata Hendel 1914: 43; Aczél 1950: 189 [in catalog].

Eucecidochares quinquefasciata: Hering 1941: 146 [Peru, Bolivia].

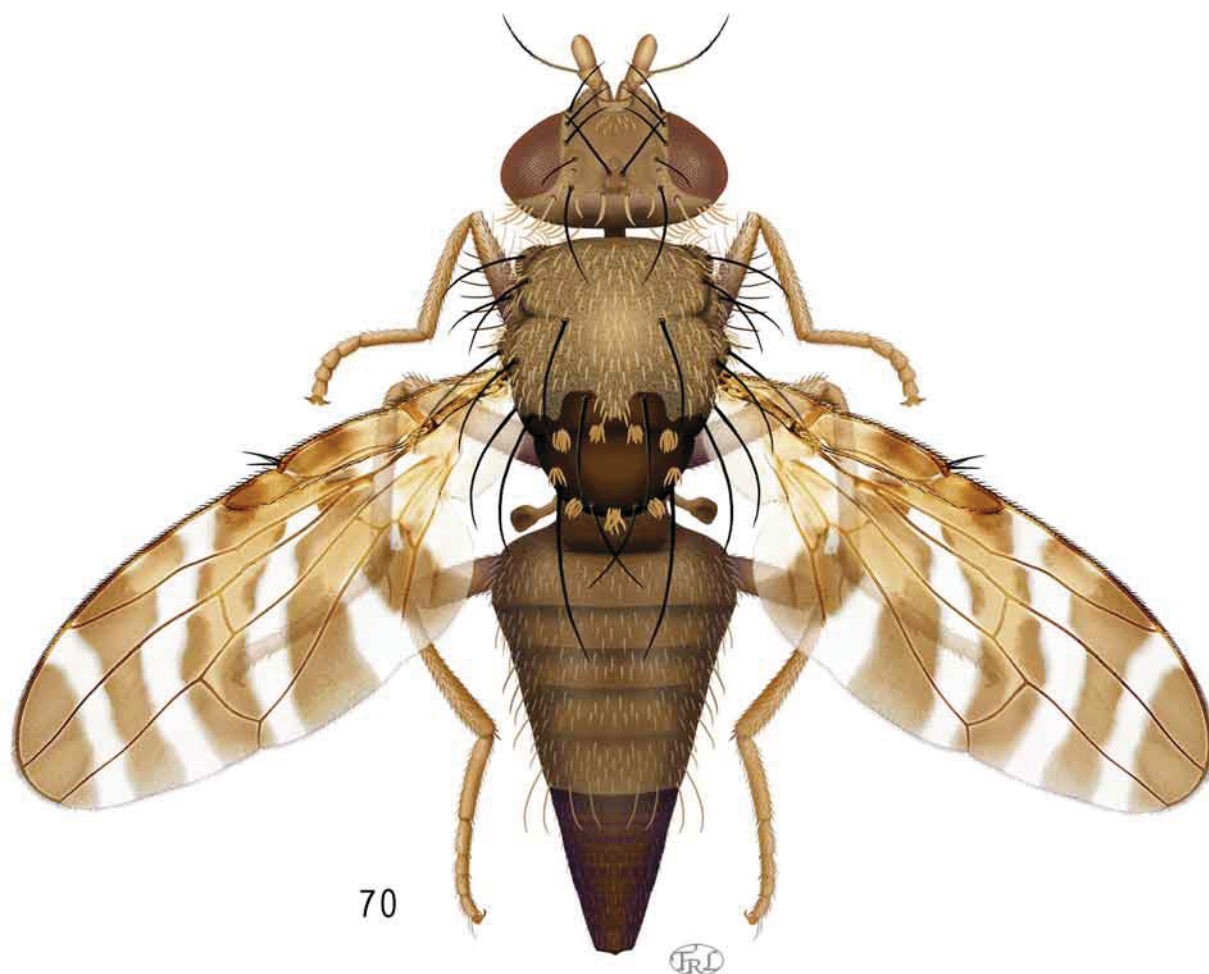
Cecidochares quinquefasciata: Hendel 1936: 74; Aczél 1953: 145; Foote 1967: 20 [in catalog]; Hardy 1968: 111 [type data]; Norrbom et al. 1999: 117 [in catalog].

Description. Body length, male 4.5–6.0 mm, female 6.0–7.0 mm. Mesonotum length 2.2–2.4 mm. Wing length 4.80–5.60 mm, width 1.95–2.25 mm, ratio 2.43–2.49.

Head (Fig. 70): Orange except occiput dorsally and ocellar tubercle brown, entirely whitish to grayish microtrichose. Parafacial without brown spot. Frons anteromedially with numerous slender yellow setulae; 3 brown, acuminate frontal setae; 2 orbital setae, both acuminate, anterior seta brown, posterior seta yellow or brown [brown on 2 Peruvian males and on 1 side on 1 Bolivian female]; ocellar and medial vertical setae well developed, brown; lateral vertical seta lanceolate, yellow, ca. 1/3 as long as medial vertical seta; postocellar and paraverticilar setae yellow, lanceolate; postocular setae mixed minute, brown, acuminate and large, yellow, lanceolate; genal seta brown; postgenal setulae numerous, large, yellow, acuminate. Facial ridge relatively broad, with numerous proclinate pale to moderate brown setulae, larger and dark brown in 2 Peruvian males [Oroya, Ondores], in male with posterior 1–2 rows of setulae laterocline.

Thorax (Fig. 70): Dark brown, postpronotal lobe often partly orange; mostly densely microtrichose. Mesonotum grayish to tan microtrichose; posterior margin of scutum with irregular dark brown microtrichose area with pair of broad lobes extended anteriorly to or almost to acrostichal seta. Scutellum very strongly convex; shiny, nonmicrotrichose except basolateral corner, extreme apical margin, and underside dark brown microtrichose. Subscutellum dark brown microtrichose on dorsal half, shiny, nonmicrotrichose ventrally. Mediotergite shiny, nonmicrotrichose except extreme dorsolateral corner grayish microtrichose, and occasionally with small, sparser, more ventral, lateral or sublateral microtrichose area. Pleuron entirely grayish microtrichose including anepisternum and katepisternum. Thoracic setae long, dark brown, and acuminate, including postpronotal, anterior notopleural, presutural and postsutural supra-alar, dorsocentral, acrostichal, intra-alar, postalar, 2 scutellar, 1 anepisternal, and katepisternal setae. Anepimeral and other anepisternal setae yellow. Posterior notopleural seta yellow, lanceolate, less than half as long as anterior notopleural. Dorsocentral seta aligned very close to transverse suture, much closer to it than level of postsutural supra-alar seta. Scutal setulae yellow, lanceolate, more or less evenly distributed in irregular rows on gray to tan microtrichose areas; without setulae on posterior dark brown microtrichose area except 2 pairs of tight clusters of 5–10 setu-

lae near posterior margin, 1 slightly medial to acrostichal line, 1 anterior to corner of scutellum. Scutellum with 5 clusters of yellow, lanceolate setulae, 1 pair proximal to basal seta, 1 pair on margin between basal and apical setae, and 1 unpaired cluster on margin between apical setae.



FIGURES 70–74. *Phacelochaeta quinquefasciata*: 70, female habitus, dorsal (Bolivia: “Cordillere”, USNMMENT00213092); female terminalia (Bolivia: “Cordillere”, USNMMENT00213094): 71, oviscapae, ventral; 72, eversible membrane, ventral; 73, aculeus, ventral; 74, aculeus tip, ventral.

Wing (Fig. 55): Costa with 3 setae at subcostal break 2–4 times as large as other costal setulae. Pterostigma 0.50–0.54 times as long as cell c, subtriangular; vein R_1 gradually curved. Vein R_{2+3} moderately long, distance between apices of R_1 and R_{2+3} / distance between apices of R_{2+3} and R_{4+5} : 1.35–1.67. Crossvein r-m 0.73–0.76 distance from bm-cu to dm-cu. Wing pattern with 5 orange and moderate brown bands. Wing base, including cells bc and extreme base of cell br orange, extending into cells c, bm, and bcu and connecting with first band. First band extending from costal margin in distal half of cell c to posterior margin in anal lobe, covering crossvein bm-cu; at most slightly broadened posteriorly, well separated from apex of vein A_1+Cu_2 (1 male has separate small brown spot at apex of A_1+Cu_2). Second band broadly connected to first band in cells br and dm, extending obliquely to posterior margin in cell cu_1 . Third band connected to first band from costal margin to vein R_{2+3} , extending from pterostigma to posterior margin in base of cell m, including apex of vein Cu_1 , covering crossveins r-m and dm-cu; in cell r_1 distal margin oblique, straight to slightly concave. Fourth band very broad in middle and apical part of cell r_1 , extending to apex of cell, often with 1–2 small marginal hyaline spots within it (second spot present only in Peru: Ondores male); occasionally narrowly connected to fifth band in cell r_{4+5} (1 wing of 1 female) or cell m (1 wing of 1 male). Fifth (apical) band semicircular, separated from fourth band by convex hyaline band, in Peru: Ondores male with narrow hyaline marginal marks in cells r_{2+3} and r_{4+5} .

Abdomen: Tergites dark brown except sometimes extreme lateral margin of syntergite 1+2 or apical margin of male tergite 5; entirely moderately densely grayish microtrichose. Sternites mostly brown to mostly yellow. Setulae mostly yellow, lanceolate; brown, acuminate basomedially on tergites 3–5.

Male terminalia: Epandrium brown, grayish microtrichose. Lateral surstylus (Figs. 73–74) tapering to slender, acute apex, extending beyond apex of medial surstylus by slightly more than length of prenisetae. Glans (Figs. 77–78) short and stout, mostly sclerotized, acrophallus with subapical bend.

Female terminalia: Oviscape (Figs. 70–71) 1.7–2.1 mm long, 0.71–0.88 times as long as mesonotum, shiny nonmicrotrichose, with setulae slender, acuminate, brownish. Spermathecae (Fig. 79) ovoid with moderately long cylindrical neck.

Distribution. Peru and Bolivia. Records from Ecuador were based on *P. quinquevittata*.

Type data. Hendel described this species based on “11 ♂ ♀ aus Peru, Cuzco, 3600 m, April Oroya [=Junín: La Oroya] 4000 m.” There are six syntypes in the SMT, including one with a Hendel determination label and a red “Typus” label, all from Cuzco except 1 male from Oroya. The other Cuzco specimens and the Oroya specimen have red “paratypus” labels, although all are syntypes. There are also 2 male and 1 female syntypes from Cuzco in Hendel’s collection in the NMW, and one male (labeled as a paratype) from Cuzco in the BMNH.

Material examined. BOLIVIA: [La Paz:] Cordillere [Cordillera Real], 4–5000 m, 24 Dec 1902, [C. A. W. Schnuse], 1♂ (BMNH) 1♀ (SMT USNMMENT00213093) 1♀ (USNM USNMMENT00213094). PERU: Cuzco: Cuzco, 3700–4200 m, 8 Apr 1905, [Schnuse Collection], 1♂ syntype (USNM USNMMENT00213096). Junín: [La] Oroya [11°32'S 75°54'W], 4000 m, 21 Jan 1904, [C. A. W. Schnuse], 1♂ syntype (SMT USNMMENT00213095); Ondores, 4100 m, puna and wet pastures, 28–31 Dec 1980, Gardenfors, Hall & Danielsson, 1♂ (ZIL USNMMENT00213097).

Phacelochaeta quinquevittata (Norrbon), new combination

Fig. 56

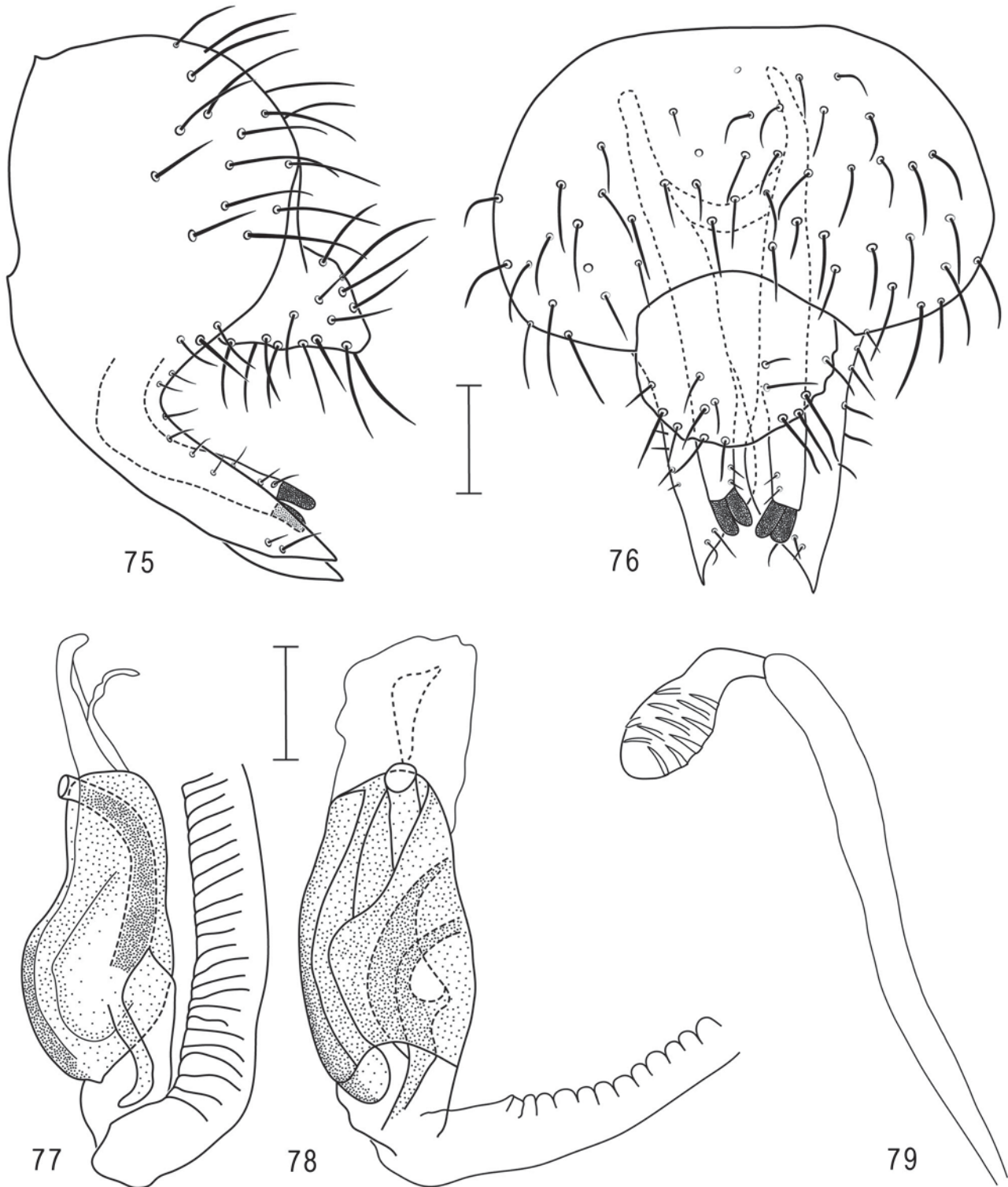
Oedaspis quinquefasciata Becker 1919: 192 (preoccupied by Hendel 1914); Aczél 1950: 314 [in catalog].

Cecidochares quinquevittata Norrbom in Norrbom et al. 1999: 117 (new name for *quinquefasciata* Becker 1919).

Description. Body length, female 5.5 mm. Mesonotum length 2.0 mm. Wing length 5.0 mm, width 2.1 mm, ratio 2.38.

Head: Orange except occiput dorsally and ocellar tubercle brown, entirely whitish to grayish microtrichose. Parafacial without brown spot. Frons anteromedially with numerous slender yellow setulae; 2–

3 brown, acuminate frontal setae; 2 orbital setae, anterior seta brown, acuminate, posterior seta yellow, slightly lanceolate; ocellar and medial vertical setae well developed, brown; lateral vertical seta lanceolate, yellow, ca. 1/3 as long as medial vertical seta; postocellar and paraverticlar setae yellow, lanceolate; postocular setae mixed minute, brown, acuminate and large, yellow, lanceolate; genal seta brown; postgenal setulae numerous, large, yellow, acuminate. Facial ridge relatively broad, with numerous proclinate slender yellow setulae.



FIGURES 75–79. *Phacelochaeta quinquefasciata*: male terminalia (Bolivia: “Cordillere”, USNMENT00213091): 75–76, epandrium and surstyli, lateral and posterior; 77–78, glans, dorsal and lateral; 79, spermatheca (Bolivia: “Cordillere”, USNMENT00213094).

Thorax: Dark brown except postpronotal lobe mostly orange; mostly densely microtrichose. Mesonotum grayish microtrichose; posterior margin of scutum with irregular dark brown microtrichose area with 2 pairs of broad angular lobes extended anteriorly, 1 to acrostichal seta and 1 almost to intra-alar seta. Scutellum very strongly convex; shiny, nonmicrotrichose except basolateral corner, extreme apical margin, and underside dark brown microtrichose. Subscutellum dark brown microtrichose on dorsal half, shiny, nonmicrotrichose ventrally. Mediotergite shiny, nonmicrotrichose except extreme dorsolateral corner grayish microtrichose, and ventrolateral margin sparsely microtrichose. Pleuron entirely grayish microtrichose including anepisternum and katepisternum. Thoracic setae long, dark brown, and acuminate, including postpronotal, anterior notopleural, presutural and postsutural supra-alar, dorsocentral, acrostichal, intra-alar, postalar, 2 scutellar, 1 anepisternal, and katepisternal setae. Anepimeral and other anepisternal setae yellow. Posterior notopleural seta yellow, lanceolate, less than half as long as anterior notopleural. Dorsocentral seta aligned very close to transverse suture, much closer to it than level of postsutural supra-alar seta. Scutal setulae yellow, lanceolate, more or less evenly distributed in irregular rows on gray microtrichose areas; without setulae on posterior dark brown microtrichose area except 2 pairs of tight clusters of 5–10 setulae near posterior margin, 1 slightly medial to acrostichal line, 1 anterior to corner of scutellum. Scutellum with 5 clusters of yellow, lanceolate setulae, 1 pair proximal to basal seta, 1 pair on margin between basal and apical setae, and 1 unpaired cluster on margin between apical setae.

Wing (Fig. 56): Costa with 3–4 setae at subcostal break 2–4 times as large as other costal setulae. Pterostigma 0.53 times as long as cell c, subtriangular; vein R_1 gradually curved. Vein R_{2+3} moderately long, distance between apices of R_1 and R_{2+3} / distance between apices of R_{2+3} and R_{4+5} : 1.29. Crossvein r-m 0.76 distance from bm-cu to dm-cu. Wing pattern with 5 orange and moderate brown bands. Wing base, including cells bc and extreme base of cell br orange, extending into cells c, bm, and bcu and connecting with first band. First band extending from costal margin in distal half of cell c to posterior margin in anal lobe, covering crossvein bm-cu; distinctly broadened posteriorly, extended distally to apex of vein A_1+Cu_2 (only slightly broader and not reaching vein according to Becker 1919, pl. XVI, fig. 7). Second band broadly connected to first band in cells br and dm, extending obliquely to posterior margin in cell cu_1 . Third band connected to first band from costal margin to vein R_{2+3} , extending from pterostigma to posterior margin in base of cell m, including apex of vein Cu_1 , covering crossveins r-m and dm-cu; in cell r_1 distal margin oblique, slightly concave. Fourth band very broad in middle and apical part of cell r_1 , almost reaching apex of cell, with or without 1 small marginal hyaline spot within it; separate from fifth band except narrowly connected along posterior margin (completely separate according to Becker 1919, pl. XVI, fig. 7). Fifth (apical) band elongate and narrow, not extended to apex of vein R_{2+3} , separated from fourth band by slightly concave hyaline band, without hyaline marginal marks.

Abdomen: Tergites dark brown except lateral margin of syntergite 1+2; mostly moderately densely grayish microtrichose; female tergite 6, except basal margin, shiny nonmicrotrichose. Sternites yellow. Setulae whitish, lanceolate.

Female terminalia: Oviscape 1.5 mm long, 0.75 times as long as mesonotum, shiny nonmicrotrichose, with setulae yellow, slightly lanceolate.

Remarks. *Oedaspis quinquefasciata* Becker, 1919 is not a synonym of *Phacelochaeta quinquefasciata* (Hendel), as proposed by Aczél (1953), although it is a secondary junior homonym of that name.

Type data. Becker (1919) described *Oedaspis quinquefasciata* from “7 individus” from Ecuador: “Casitagua [= Pichincha: Cerro Casitagua], alt.: 3512 m; - Danas [= Chimborazo: Cerro Danas, sometimes spelled Danna], alt.: 3778 m” collected by Rivet in 1903 and 1904. Most of the syntypes, which should be in the MNHNP, were not examined, but a female in the MZUSP collection is probably one of them. It closely matches the description and wing illustration provided by Becker, except that the two apical wing bands are narrowly connected along the posterior margin.

Distribution. Ecuador.

Material examined. ECUADOR: [Chimborazo: Cerro] Danas [2°8'S 78°53'W], 3792 m, 1904, P. Rivet, “Museum Paris”, “4007”, “*Oedaspis 5-fasciata* B.”, 1♀ probable syntype of *quinquefasciata* Becker (USNMMENT00213086).

Plaumannimyia Hering

Plaumannimyia Hering 1938 (type species *P. pallens* Hering, by original designation).

Trypanaresta Hering 1940 (type species *Trypanea imitatrix* Hering, by original designation). **New synonymy.**

Trypanaresta Hering is here considered a subjective junior synonym of *Plaumannimyia* Hering. Species of both taxa lack dorsal preapical setae on the hind femur (synapomorphy). These two genera have been separated mainly on the basis of their wing patterns. The two species currently included in *Plaumannimyia* have nearly evenly reticulate patterns, whereas species previously placed in *Trypanaresta* generally have stellate or bicolored patterns, but some undescribed species approach the wing pattern in *P. pallens* and *P. costaemaculata*, except for having a solid subapical brown spot. Furthermore, at least one undescribed species with a more typical stellate pattern has highly derived male terminalia like the above two species currently included in *Plaumannimyia*, with the lateral surstylus elongate and strongly posteriorly curved, and the medial surstylus with the medial prensiseta greatly enlarged, more than four times as long as wide (Figs. 80–81). Species of both genera breed in flowerheads of *Baccharis* and its close relatives (Asteraceae: Astereae). Given the introgression in these characters and their similar biology, *Trypanaresta* is considered a junior synonym of *Plaumannimyia*. The following species are transferred to *Plaumannimyia* as **new combinations** (original genus in parentheses): *P. ameghinoi* (Brèthes 1908) (*Urellia*), *P. coelestina* (Hering 1938) (*Trypanea*), *P. delicatella* (Blanchard 1852) (*Acinia*), *P. difficilis* (Malloch 1933) (*Trypanea*), *P. dolores* (Hering 1938) (*Trypanea*), *P. eugenia* (Wulp 1900) (*Urellia*), *P. flava* (Adams 1904) (*Urellia*), *P. hestiae* (Hendel 1914) (*Trypanea*), *P. imitatrix* (Hering 1938) (*Trypanea*), *P. miseta* (Hering 1938) (*Trypanea*), *P. plagiata* (Blanchard 1852) (*Acinia*), *P. scutellata* (Séguy 1933) (*Acanthiophilus*), *P. setulosa* (Malloch 1933) (*Trypanea*), *P. subaster* (Malloch 1933) (*Trypanea*), *P. suspecta* (Malloch 1933) (*Trypanea*), *P. thomsoni* (Hendel 1914) (*Trypanea*), *P. titschacki* (Hering 1941) (*Trypanaresta*), and *P. valdesiana* (Gandolfo & Norrbom 1997) (*Trypanaresta*).

Plaumannimyia eugenia (Wulp), new combination

Urellia eugenia Wulp 1900: 427.

Trypanea eugenia: Hendel 1914: 81.

Euaestoides eugenia: Hering 1941: 165.

Tephritis eugenia: Hering 1944: 22.

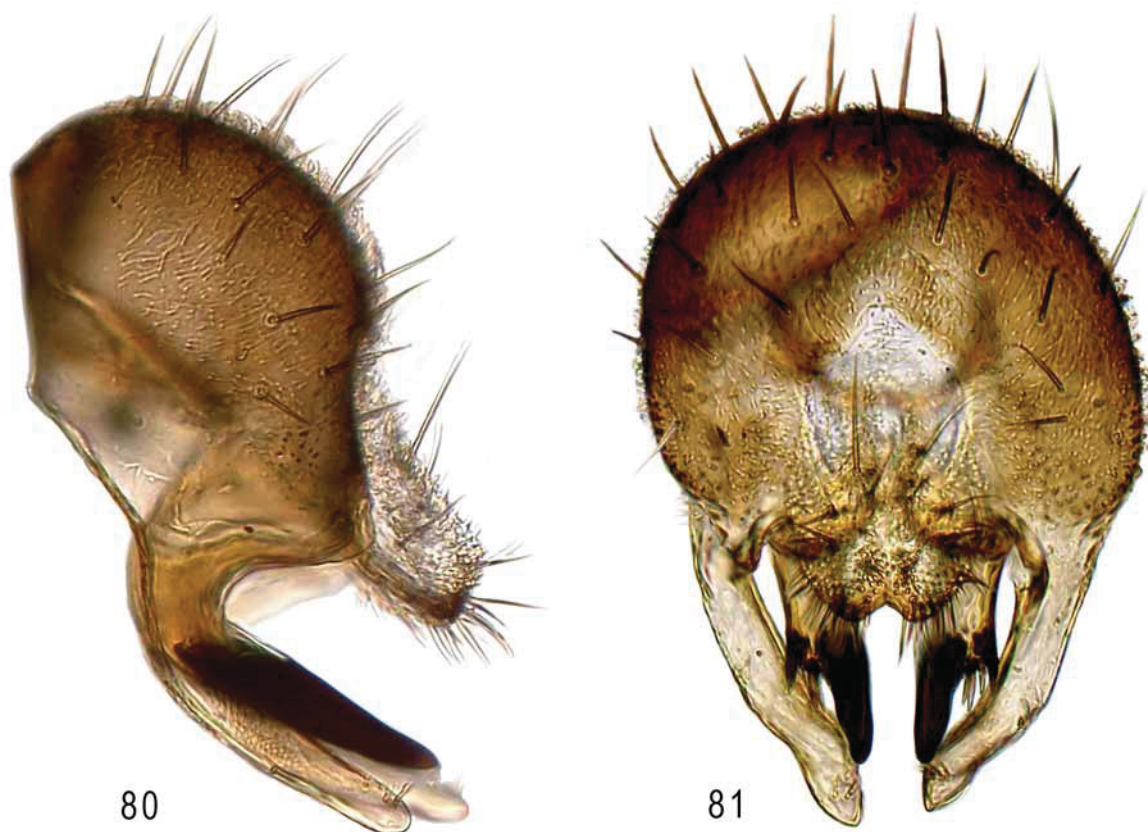
Trypanaresta eugenia: Norrbom et al. 1999: 237.

Distribution. Norrbom et al. (1999) reported the distribution as Mexico (Nayarit & Guanajuato) SE to Guatemala. Data supporting these records are listed below. The known range includes the following states of Mexico: Aguascalientes, Distrito Federal, Guanajuato, Guerrero, Jalisco, Michoacán, Morelos, Nayarit, Oaxaca, and Veracruz. Records from Peru and Chile (Hendel 1914, Hering 1941) were based on misidentifications of other *Plaumannimyia* species.

Biology. Host plants were previously unknown for this species. We reared it from flowerheads of *Archibaccharis serratifolia* (Kunth) S.F. Blake and *Baccharis serraefolia* DC. in Guatemala, and Krauss reared it from flowerheads of “*Baccharis dracunculoides*” in Mexico. The latter is not an available name (H. Robinson, pers. comm.). It is unclear whether the Palmer specimens from Oaxaca, Mexico were reared from or collected on *Baccharis salicifolia* (Ruiz & Pav.) Pers., but that plant is another possible host.

Material examined. GUATEMALA: Sacatepéquez: Volcán de Agua, trail from Ciudad Viejo, reared ex flowers of *Archibaccharis serratifolia*, 19 Oct 1990, A. L. Norrbom, 2♂ (USNM USNMENT00055972–73); Volcan de Agua, trail from Santa Maria de Jesus, cultivated zone, 14.49255°N 90.71864°W, 2115 m, emerged 21 Nov 2007 reared ex flowerheads of *Baccharis serraefolia* (07G06) collected 13 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, 2♂ (USNM USNMENT00671313–14). MEXICO: Aguascalientes: Calvillo, 10 mi. NE of, 5 Jul 1984, J. B. Woolley, 1♀ (TAMU USNMENT00212652); Calvillo, 10 mi. NE of, 5 Jul 1984, Carroll, Schaffner, Friedlander, 1♀ (USNM USNMENT00212651). Distrito Federal: Mexico City, Sep 1965,

N. L. H. Krauss, 1♂ (USNM USNMMENT00056100). Guanajuato: Guanajuato, 15 Jul 1954, R. F. Smith, 1♂ (UCB USNMMENT00055980); Guanajuato, 5 mi. N of, 25 Jul 1954, E. I. Schlinger, 1♀ (UCB USNMMENT00056567). Guerrero: Chichihualco, 15 mi. SW of, approx. 1500', 15 Jul 1984, J. B. Woolley, 1♂ 2♀ (TAMU USNMMENT00212644–46); same, Carroll, Schaffner, Friedlander, 1♂ 1♀ (TAMU USNMMENT00212647–48), 1♂ 1♀ (USNM USNMMENT00212649–50); Chilapa, 7 mi. W of, 16 Jul 1984, J. B. Woolley, 1♂ 2♀ (TAMU USNMMENT00212653–55), 1♂ 1♀ (FSCA USNMMENT00214920–21). Jalisco: El Tigre, 18 Jul 1954, E. I. Schlinger, 2♀ (UCB USNMMENT00056068–69); La Primavera, 7 Aug 1956, R. & K. Dreisbach, 1♂ 1♀ (USNM USNMMENT00056050–51). Michoacán: Zitácuaro, 10 km E of, on Rt. 15, 28 Feb 1998, A. Freidberg, 1♀ (TAUI USNMMENT00056088). Morelos: Cuernavaca, bred from flowers of *Baccharis dracunculoides*, Apr 1945, N. L. H. Krauss 545, 2♂ 2♀ 1 without abdomen (USNM USNMMENT00216995–99); Cuernavaca, 4–6 Dec 1987, F. D. Parker, 1♂ (USU USNMMENT00212522). Nayarit: Chapalilla, 15 km N, *Baccharis*, 19 Jul 1951, P. D. Hurd, 1♀ (USNM USNMMENT00056115). Oaxaca: Oaxaca, 17°2'N 96°40'W, *Baccharis salicifolia* (R.&P.) Pers., 9 Aug 1987, W. A. Palmer 87221–1–2, 1♂ 1♀ (USNM USNMMENT00216993–94); Tamazulapan, 8 mi. SE, 4 Jul 1964, A. G. Raske, 1♂ (UCB USNMMENT00056493); Tamazulpan, 1 mi. N of, 12 Jul 1973, Mastro & Schaffner, 1♀ (TAMU USNMMENT00212643). Veracruz: Tejería, 1000 m, 23 Feb 1998, A. Freidberg, 1♂ (TAUI USNMMENT00056512), 1♂ (USNM USNMMENT00056513).



FIGURES 80–81. *Plaumannimyia* sp. (Brazil: Est. Exp. Itirapina, USNMMENT00214197), epandrium and surstyli, lateral and posterior.

***Procecidochara atra* (Loew)**

Fig. 89

Distribution. Foote et al. (1993, map 60) showed the range of this species to extend from southeastern Canada (Nova Scotia, Ontario) throughout the midwestern and northeastern United States (south to Virginia and west to Kansas), with single records from Georgia and northern Florida, and four records from Idaho, Utah

and Colorado. Foote (1967) also cataloged it from Mexico (northern Sonora and Chapingo). Sutton et al. (2003) reported *P. atra* from the Appalachian Mountains of North Carolina and Tennessee, and Sutton & Steck (2005) reported that it is present in the panhandle of Florida. A few records reported below further verify and extend the known distribution of *P. atra* in the southern United States to Alabama, Mississippi, Louisiana and Texas.

The data point on the Foote et al. (1993) map in Colorado was based on a male (USNM USNMENT00214379) from Westcliffe, 10 Jun 1926, E.G. Anderson, which is not *P. atra*. It has the two large triangular hyaline areas between the wing bands similar in size, and the scutellum has one white setula basal to the basal seta, characters not occurring in *P. atra*. It may be *P. anthracina* Doane. The other three western United States records are questionable and need confirmation.

The record from Sonora in Foote (1967) is presumably based on the record of Wulp (1899a: 408, as *Oedaspis atra*) who reported four specimens (probably in the BMNH) collected by Morrison. They are doubtfully *P. atra* if Wulp's figure of the wing (Tab. XI, fig. 29) is accurate, as the subapical hyaline triangle is broader than the one between the two bands on the middle of the wing. The record from Chapingo (presumably the locality in the state of Mexico) was based on an unknown source, but also is suspect.

Material examined. Alabama: Gulf Crest, 4 Nov 1916, A. H. Sturtevant, 1♀ (USNM USNMENT00214424); Spring Hill, 26–27 Oct 1916, A. H. Sturtevant, 1♂ (USNM USNMENT00214274); Mobile Co., Kushla, 1–8 Nov 1916, A. H. Sturtevant, 1♀ (USNM USNMENT00214341); same, 2 May 1920, 1♀ (USNM USNMENT00214421); Saraland, 26–27 Oct 1916, A. H. Sturtevant, 1♂ (USNM USNMENT00214410). Georgia: Dawson Co., Amicalola Falls, 2300 ft., 20 May 1972, G.W. Byers & N. Penny, 1♀ (UKaL). Louisiana: Baton Rouge, 21 Mar 1947, W. W. Wirth, 1♂ (USNM USNMENT00214395). Mississippi: Claiborne Co., Port Gibson, 5.4 mi. NNE, 23 Apr 1972, G.W. Byers & party, 1♀ (UKaL). Missouri: Blackwater, 4 Jun 1981, J. R. Schrock, 1♀ (UKaL). Tennessee: Knox Co., 17 May 1957, 1♀ (USNM USNMENT00214414); same, 29 May 1957, 1♀ (USNM USNMENT00214413). Texas: Victoria Co., Victoria, 8 Oct 1908, J. D. Mitchell, 1♀ (USNM USNMENT00214353).

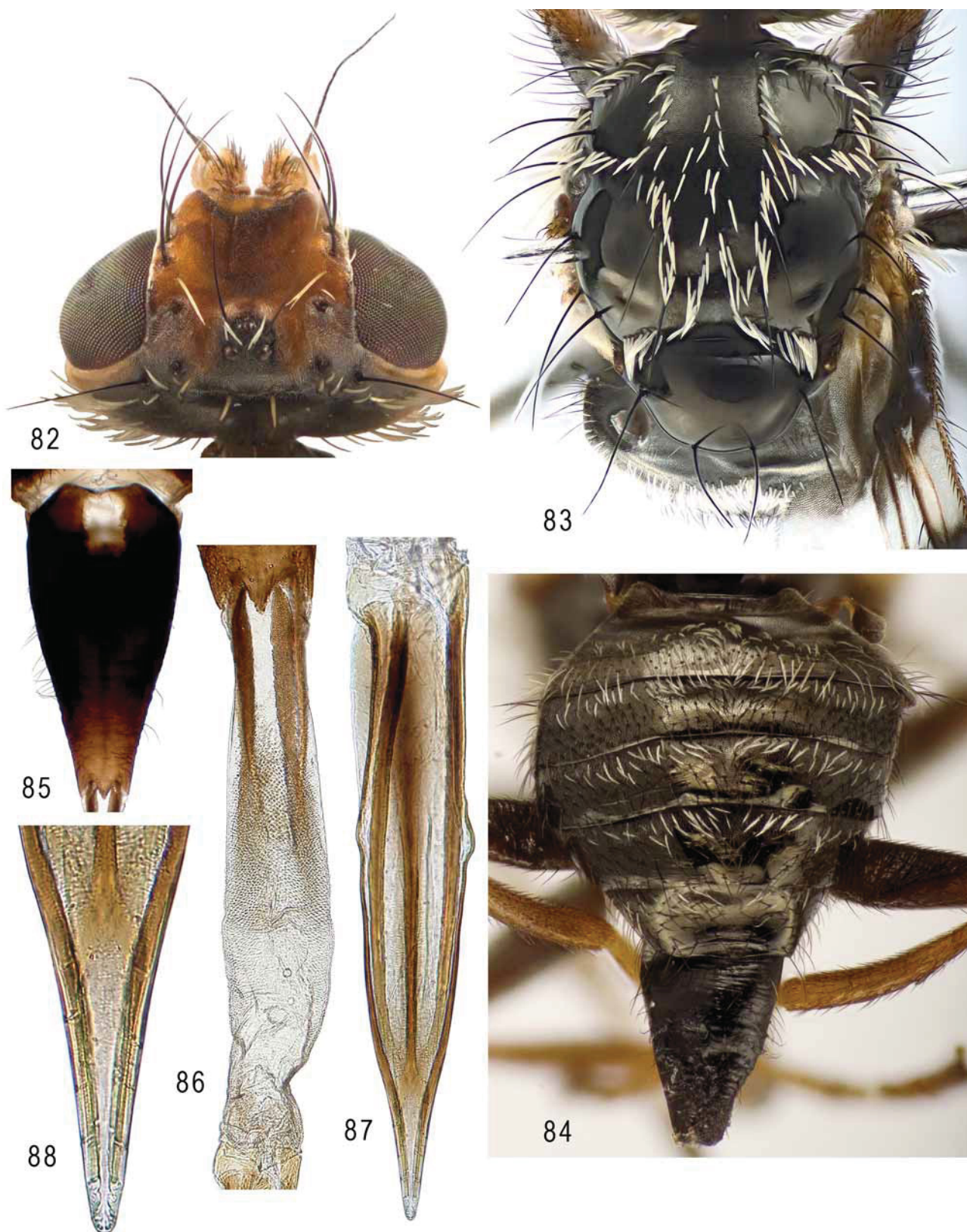
Procecidochares suttoni Norrbom, new species

Figs. 69, 82–88, 90

Diagnosis. This species differs from most other species of *Procecidochares* reported from Mesoamerica in having the anepisternum with a large, shiny, nonmicrotrichose area. It is most similar to *P. atra* to which it runs in the key of Goeden & Norrbom (2001) to the species of the United States and Canada. It differs in the shape of the hyaline marginal area in cells r_{2+3} and r_{4+5} , which extends deeper into the apical band; it does not reach the apex of vein R_{4+5} along the margin, but extends into r_{4+5} subapically (Fig. 90). Most of the alula and the proximal margin of the anal lobe are brown, whereas they are hyaline in *P. atra* (Fig. 89). Crossvein r-m is usually more proximal in *P. suttoni* (distance from bm-cu to r-m/ distance from bm-cu to dm-cu along vein M 0.737–0.803, 0.755 ± 0.028 , $n=5$ in *P. suttoni*, 0.762–0.841, 0.809 ± 0.010 , $n=10$ in *P. atra*), and in *P. suttoni* the posteroapical lobe on cell bcu is slightly smaller, with the bend in cell Cu_2 slightly less pronounced than in most *P. atra*. The frons in *P. suttoni* (Fig. 82) often has a large black or white, posteromedially oriented setula between the posterior frontal seta and the orbital seta that is never present in *P. atra*. The following couplet can be inserted into the key of Goeden & Norrbom (2001) to separate these two species (with the host and distribution information and “*P. atra*” at the end of the first half of couplet 12 replaced by “12A”).

- 12A. Wing (Fig. 90) with hyaline marginal area in cells r_{2+3} and r_{4+5} extending deeply into apical band, not reaching apex of vein R_{4+5} along margin, but extending into r_{4+5} subapically. Alula mostly pale brown; proximal margin of anal lobe brown, often connected to band covering bm-cu and Cu_2 . Frons (Fig. 82) with 3–4 frontal setae and often with large black or white, posteromedially oriented setula between the posterior frontal seta and orbital seta. Host *Archibaccharis asperifolia*. Guatemala *suttoni* Norrbom
- Wing (Fig. 89) with hyaline marginal area in cells r_{2+3} and r_{4+5} irregular in shape but shallower, reaching apex of vein R_{4+5} or extending into cell r_{4+5} along margin. Alula and proximal margin of anal lobe hyaline. Frons with 2–3

frontal setae, without posteromedially oriented setula between posterior frontal seta and orbital seta. Hosts *Solidago* spp. Eastern USA & Canada.....*atra* (Loew)



FIGURES 82–88. *Procecidochares suttoni* (Guatemala: Santa Cruz - San Lorenzo road, USNMENT00104214): 82, head, dorsal; 83, thorax, dorsal; 84, abdomen, dorsal; 85, oviscape, ventral; 86, eversion membrane, ventral; 87, aculeus, ventral; 88, aculeus tip, ventral.

Description. Small to moderate sized, body length 3.5–4.5 mm. Mesonotum length 1.32–1.92 mm. Wing length 4.00–4.90 mm, width 1.55–2.10, ratio 2.33–2.58.

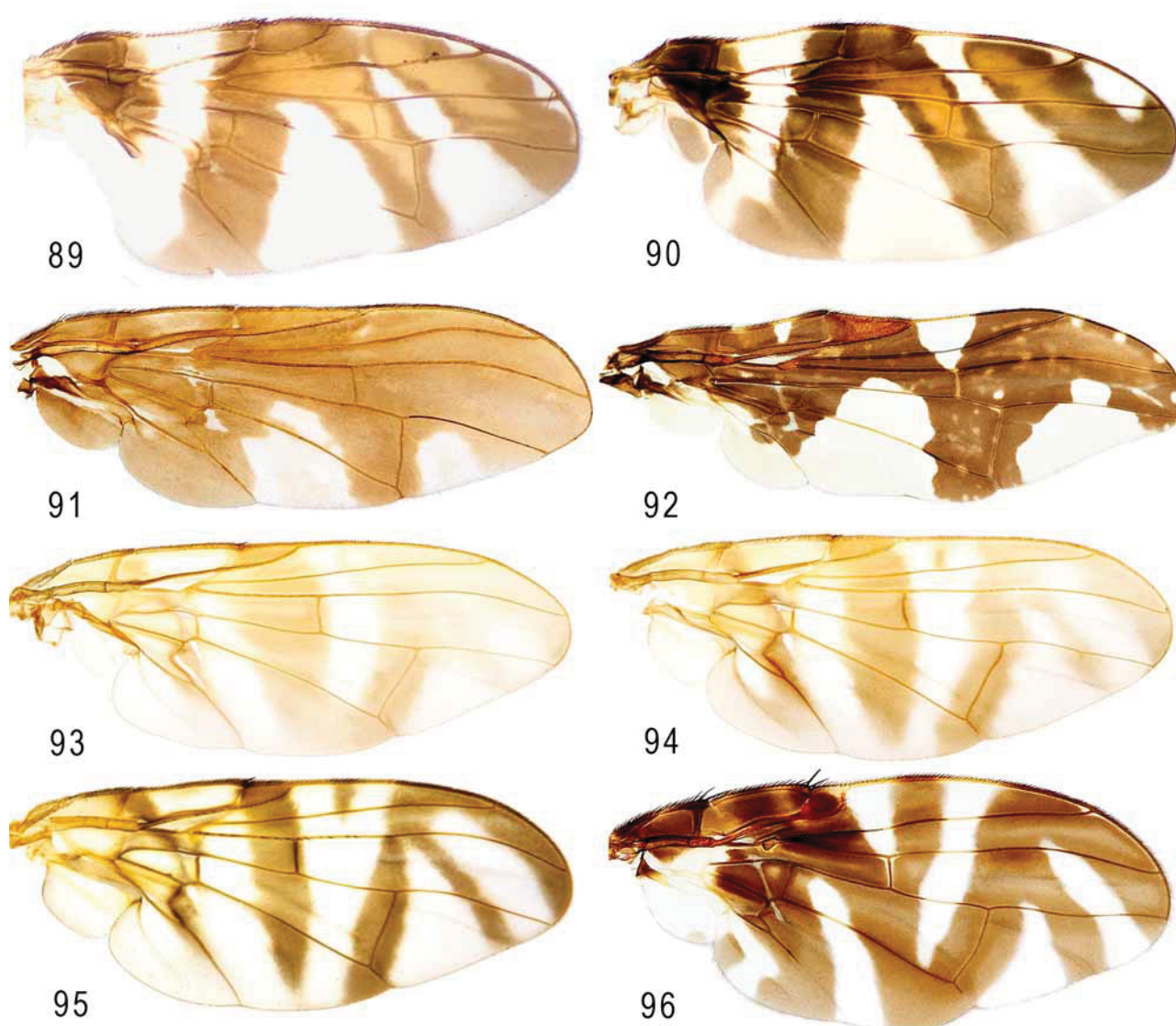
Head (Fig. 82): Mostly orange and entirely microtrichose, ocellar tubercle, most of occiput, and postgena posteriorly dark brown; gena orange, without brown spot; face and postgena anteriorly whitish microtrichose. Most setae dark brown to black, acuminate. Frons broad, 2.06–2.22 times as broad as width of eye; nonsetulose medially, often (6 of 8 specimens checked) with 1 relatively large, white or black, posteromedially directed setula between posterior frontal seta and orbital seta; with a few white, lanceolate setulae near lateral margin and on ocellar tubercle; 3–4 frontal setae, 1 black, acuminate orbital seta; ocellar seta and medial vertical seta well developed, black, acuminate; lateral vertical seta black, acuminate, 0.74–0.82 times as long as medial vertical seta; postocellar and paraverticlar setae whitish, lanceolate; postocular setae whitish, lanceolate, all large and subequal; facial ridge setulae fine, brown, acuminate, a few dorsal setulae often yellowish; genal setulae mostly brown, sometimes posteriorly mixed with several white setae; setulae of occiput and postgena whitish, lanceolate. Face with medial carina weak, narrow. Lunule 0.36–0.39 times as high as wide (measured at dorsal margin of antennal sockets). Eye large, 1.41–1.58 times as high as long, with single broad medial vertical green band (observed soon after death, faded in most of the specimens), genal height 0.27–0.31 times eye height. Antennal first flagellomere 1.3–1.5 times as long as wide (measured on mesal side); arista entirely minutely pubescent, sometimes more sparsely on distal half.

Thorax (Fig. 83): Entirely dark brown to black. Dorsally largely shiny, nonmicrotrichose, including entire postpronotal lobe, anterior half of anepisternum, lateral third of scutum, and most of scutellum. Notopleuron densely grayish to whitish microtrichose on posterior half, extending narrowly posteriorly on lateral margin of scutum to ca. level of postsutural supra-alar seta. Scutum less densely grayish microtrichose medially except extreme anterior margin and sometimes narrow medial area ca. as wide as medial rows of setulae extending to anterior setulae; microtrichose area anterior to transverse suture extending laterally slightly beyond dorsocentral line, slightly broader near suture, posteriorly gradually slightly narrowing, including postsutural dorsocentral seta, acrostichal seta at margin or narrowly included. Scutellum dark brown microtrichose only on anterolateral corner, not extending to basal seta, and on underside. Subscutellum entirely densely dark brown microtrichose. Mediotergite densely whitish gray microtrichose on dorsal half. Pleuron mostly grayish microtrichose; anepisternum shiny nonmicrotrichose except narrowly on dorsal margin, most of area posterior to phragma, and narrowly bordering medial row of setulae; katepisternum shiny nonmicrotrichose except ventral, anterior, and dorsal margins. Following setae well developed, dark brown to black, acuminate: postpronotal, 2 notopleural, presutural and postsutural supra-alar, intra-alar, postalar, 2 dorsocentral (1 presutural; 1 aligned slightly anterior to postsutural supra-alar seta), acrostichal (displaced laterally, almost in dorsocentral line), 2 scutellar, 1 anepisternal, and katepisternal setae. Posterior notopleural seta subequal to anterior notopleural seta. Anepimeral seta whitish, lanceolate, not differentiated from large setulae. Scutal setulae white, lanceolate; medially in 3 irregular stripes 1–3 setulae wide, 1 unpaired stripe on midline and 1 on each dorsocentral line, posteriorly near level of acrostichal seta fusing to form 2 stripes; presuturally with row of setulae anterior to transverse suture and on anterior and lateral margins, extending onto postpronotal lobe, with dorsocentral setulae forming nearly oval pattern, in lateral view lateral setulae closer to notopleural setae than to presutural supra-alar seta; postsuturally without setulae on lateral third except posterior margin with paired cluster of 6–10 setulae anterior to corner of scutellum; without setulae anterior to postsutural supra-alar seta or on intra-alar line. Scutellum strongly convex, broad; without setulae. Pleural setulae whitish, lanceolate except sometimes 1–2 setulae on katepisternum brown, acuminate; on anepisternum anterior to phragma in 3 stripes, 1 along dorsal margin, 1 aligned with acuminate anepisternal seta, sometimes connected to dorsal stripe anteriorly, and 1 shorter and sometimes poorly differentiated stripe midway between second stripe and ventral margin, posterior to phragma with setulae irregularly arranged.

Legs: Femora dark brown except apically. Tibiae and tarsi yellow to orange. Fore femur nonmicrotrichose, shiny on posterior side. Other femora entirely microtrichose. All femoral setae and setulae brown, acuminate.

Wing (Fig. 90): Pterostigma 0.54–0.61 times length of cell c, 2.36–2.57 times as long as wide. Lobe of cell *bcu* short, at most 0.30 times as long as width of cell, section of vein *Cu*₂ distal to bend 0.75–0.86 times as

long as section proximal to bend. Crossvein r-m at 0.74–0.80 distance from bm-cu to dm-cu on vein M. Node of Rs and vein R_{4+5} dorsally without setulae. Pattern with wing base and 3 broad crossbands mostly moderate brown. Basal brown area extending from costa in cell bc and base of cell c across extreme base of cell br, and bases of cells bm and bcu, and basal margin of anal lobe, extending distally slightly beyond level of fork of veins R_1 and RS, in anal lobe often narrowly connected to posterior part of band over bm-cu. Alula mostly pale brown. First band entirely brown, extending from costa in distal half of cell c and base of pterostigma to posterior wing margin, covering crossvein bm-cu and veins Cu_2 and A_1+Cu_2 , broader on posterior margin. Second band broadly connected to first anteriorly in pterostigma and cells r_1 and r_{2+3} ; extending obliquely to posterior margin on apex of vein Cu_1 , covering crossveins r-m and dm-cu; mostly brown, with orange medial area in cell r_{2+3} and bordering both sides of r-m. Third (apical) band isolated from second band, triangular hyaline area between them ca. two-thirds as wide as hyaline area between first and second bands; band extending obliquely from apical part of cell r_1 to apices of cells m and r_{4+5} ; mostly brown, with orange medial area in cells r_1 , r_{2+3} , and anteriorly in cell r_{4+5} . Hyaline marginal area in cells r_{2+3} and r_{4+5} broad, extending deeply into apical band, not reaching apex of vein R_{4+5} along margin, but extending into r_{4+5} subapically.



FIGURES 89–96. Wings: 89, *Procecidochares atra* (USA: New York: Babylon); 90, *P. suttoni* (Guatemala: Santa Cruz - San Lorenzo road, USNMENT00104214); 91, *Pyrgotoides* sp. (Ecuador: Quito, USNMENT00104460); 92, *P. peruvianus* (Peru: Chachapoyas); 93, *Rhagoletis fuscobasalis* (lectotype); 94, *Rhagoletis* sp. nr. *fuscobasalis* (Argentina, Rodeo, USNMENT00213082); 95, *Rhagoletis ferruginea* (Brazil: Nova Teutonia); 96, *Stenopa mexicana* (holotype).

Abdomen (Fig. 84): Tergites entirely dark brown to black; mostly grayish microtrichose, in female shiny nonmicrotrichose on posterior half to two-thirds of tergites 4 and 5 and all of tergite 6; in male shiny nonmicrotrichose on posterior half of tergite 4 except for narrow medial microtrichose area and on posterior three-fourths of tergite 5 except for narrow medial microtrichose area extending to ca. midlength. Syntergite 1+2 with fine, acuminate, yellow to brown setulae on basal third, with nonsetulose medial gap, and with whitish, lanceolate setulae on most of posterior third, becoming finer and yellowish laterally, and brown on lateral margin. Tergites 3–5 nearly evenly setulose, most setulae brown, acuminate, those on basal fourth to third except laterally white, lanceolate. Female tergite 6 with setulae brown, acuminate posteriorly, on anterior half with most setulae whitish except laterally.

Male terminalia (Fig. 69): Epandrium and surstyli brown. Surstyli broad, together broader than epandrium, short and rounded, apex bluntly truncate and medially directed, without posterodorsal lobe; medial surstylus short, with 2 prensisetae, lateral prensiseta very small. Glans short, stout, mostly sclerotized; acrophallus stout, with 45° angle subapical turn.

Female terminalia: Oviscape (Figs. 84–85) (measured ventrally from apex of basal medial desclerotized area, which is elongate and slender) 0.9–1.0 mm long, 0.47–0.51 times as long as mesonotum (1.24 mm measured to basolateral corner in larger specimen); entirely dark brown, shiny, nonmicrotrichose. Setulae fine, brown, acuminate. Eversible membrane (Fig. 86) with pair of taenia dorsally and ventrally. Aculeus (Figs. 87–88) 0.93 mm long, ca. 6.6 times as long as wide, tapering on distal fifth to elongate triangular tip. 2 spermathecae dark, globose.

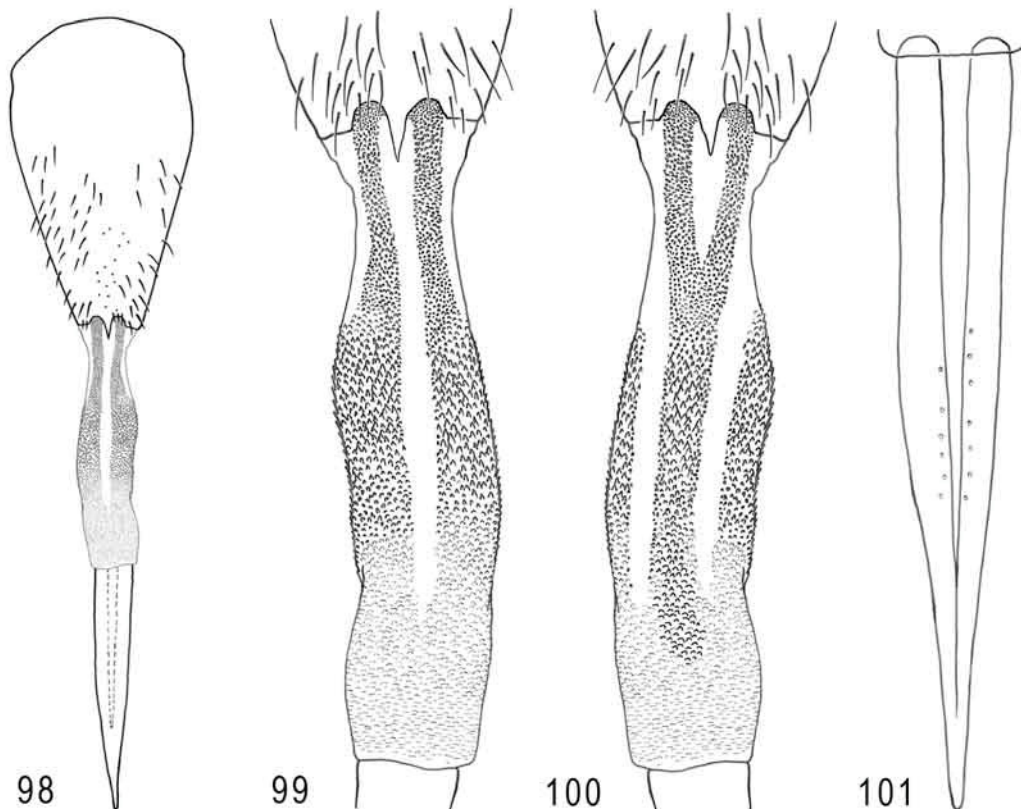
Remarks. *Procecidochares suttoni* appears to be the sister species of *P. atra*, which is widespread in eastern Canada and the United States. The galls of *P. suttoni* (Fig. 111–113) are very similar to those that *P. atra* induces on several species of *Solidago* (Foote et al. 1993, Sutton et al. 2005).

Distribution. Guatemala. The type series was collected in highland areas (> 1000 m elevation) of Guatemala (Santa Rosa, Suchitepéquez, Zacapa). The full distribution may extend to other countries as the host plant ranges from central Mexico to Nicaragua (TROPICOS database).

Biology. The type series was reared from leafy axillary galls on *Archibaccharis asperifolia* (Benth.) S.F. Blake (Asteraceae: Astereae) (Figs. 110–113).

Type data. Holotype ♀ (USNM USNMENT00671427), GUATEMALA: Zacapa: Santa Cruz - San Lorenzo Road, 15.06692°N 89.68659°W, 1488 m, emerged 5–9 Dec 2008 reared ex leafy gall on *Archibaccharis asperifolia* (07G34) collected 19 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón. Paratypes: GUATEMALA: Santa Rosa: Cerro Mira Mundo, Finca Mira Mundo, 14.20402°N 90.51535°W, 1850 m, 6m Malaise trap, 21–24 May 2008, Sutton & Monzón, 1♀ (FSCA). Suchitepéquez: Santa Barbara, Pacific slope of Volcan Atitlan, Finca Panama, vic. 14.539°N 91.2°W, 1000–1500 m, Nov 2007, Pérez, 3♂ (FSCA); same, May 2008, 2♂ (FSCA). Zacapa: road to plateau N of San Lorenzo, 15.09418°N 89.67226°W, 1879 m, emerged 15 Dec 2007 reared ex leafy gall on *Archibaccharis asperifolia* (07G34) collected 18 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 1♂ (UVG); Santa Cruz - San Lorenzo Road, 15.07593°N 89.68542°W, 1638 m, emerged 30 Nov 2007 reared ex leafy gall on *Archibaccharis asperifolia* (07G34) collected 18 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 1♀ (USNM USNMENT00104214); Santa Cruz - San Lorenzo Road, "cow pasture", 15.07382°N 89.68455°W, 1599 m, emerged 9 Dec 2008 reared ex leafy gall on *Archibaccharis asperifolia* (07G34) collected 18 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 2♂ (USNM USNMENT00671423–24); Santa Cruz - San Lorenzo Road, 15.06692°N 89.68659°W, 1488 m, emerged 5–9 Dec 2008 reared ex leafy gall on *Archibaccharis asperifolia* (07G34) collected 19 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 3♂ (FSCA), 6♂ (USNM USNMENT00671425–26, USNMENT00671428–32).

Etymology. This species is named for Bruce Sutton, one of the collectors of the type series.



FIGURES 97–101. 97, *Pyrgotoides* sp. (USNMENT00056535, Bolivia: Apa Apa), male habitus; *P. peruvianus* (Peru: Chachapoyas, USNMENT00213121): 98, ovipositor, dorsal; 99–100, eversible membrane, dorsal and ventral; 101, aculeus, ventral.

***Pyrgotoides* Curran**

Figs. 91–92, 97–101

Pyrgotoides Curran 1934 (type species *P. crassipes* Curran, by original designation).

Gerrhoceras Hering 1942 (type species *G. paradoxa* Hering, by original designation). **New synonymy.**

Gerrhoceras Hering is here considered a subjective junior synonym of *Pyrgotoides* Curran, and *P. paradoxus* (Hering 1942), **new combination**, and *P. peruvianus* (Korytkowski 1976), **new combination**, are transferred from *Gerrhoceras*.

Pyrgotoides belongs to the tribe Dithrycini, indicated by its eversible membrane, on which the ventral stripes of spinules extended from the taeniae are fused medially (Fig. 100) (Korneyev 1999). The species of the genus share the following mostly apomorphic characters: eye relatively small, genal height more than half long diameter of eye (Fig. 97); lunule large and setulose; antenna very short, first flagellomere no longer than pedicel; major thoracic setae short or absent; scutellum usually high and convex or produced dorsoapically, entirely microtrichose, and without distinct yellow markings; wing (Figs. 91–92) elongate (> 2.5 times as long as wide) and predominantly brown, with 2 large hyaline areas on posterior margin and often with hyaline triangle on anterior margin distal to apex of vein R₁; body large (wing length > 7 mm), predominantly brown. We have not examined the primary type specimens of either *P. crassipes* or *P. paradoxus*, but have seen other specimens that appear to be conspecific with each of them. These specimens share a further apomorphy (first flagellomere setulose) with some but not all of the other species of *Pyrgotoides*. Besides the three described species, there are at least four undescribed species. Only *P. peruvianus* has been reared; it forms large stem galls on *Ophryosporus peruvianus* (J.G. Gmel.) R.M. King & H. Rob. (Asteraceae: Eupatorieae) (Korytkowski 1976). *Pyrgotoides* species are known from Costa Rica, Panama, Ecuador, Peru, and Bolivia.

***Rachiptera* Bigot**

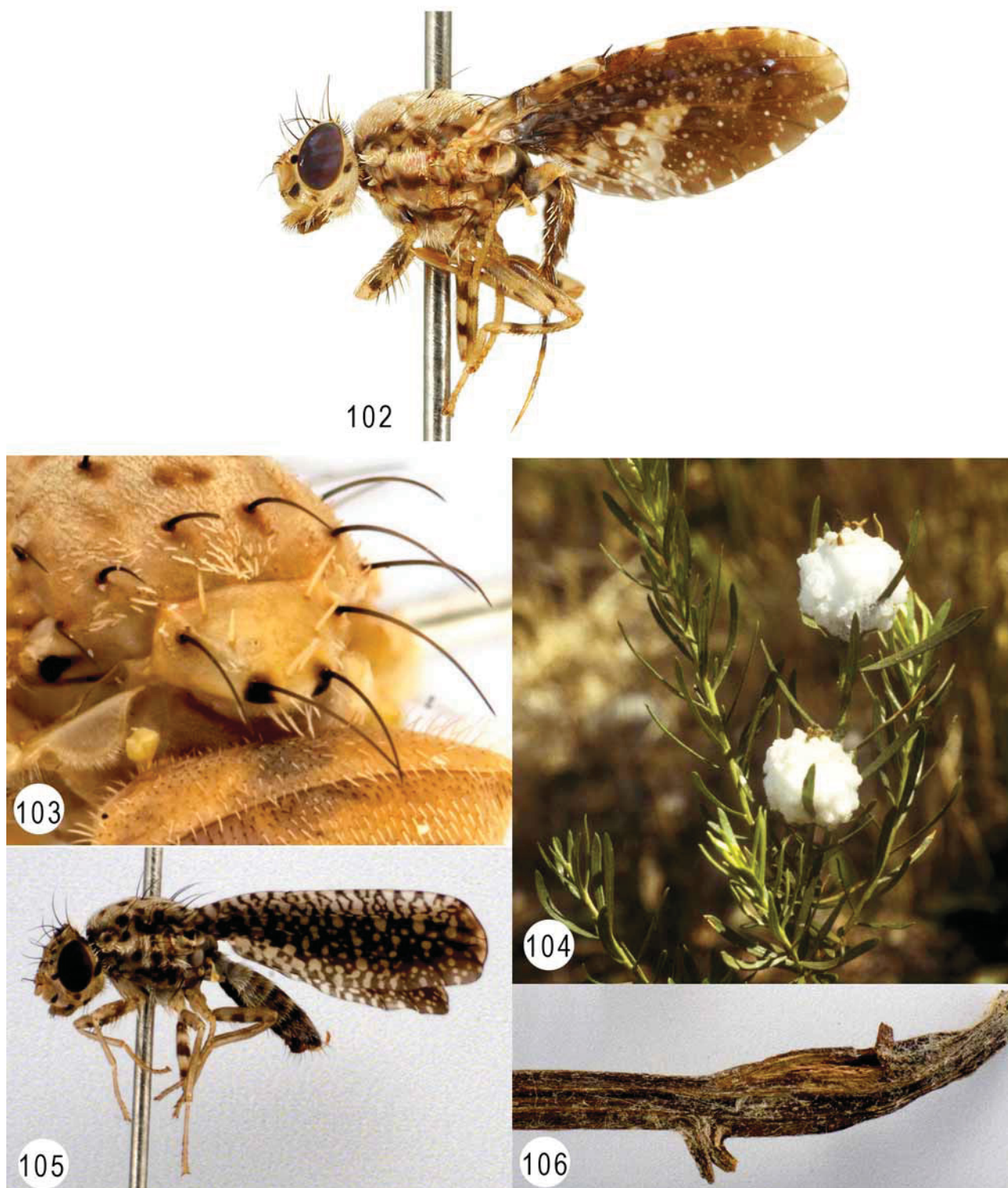
Rachiptera Bigot 1859 (type species *R. limbata* Bigot, by monotypy).

Strobelia Rondani 1868 (type species *S. baccharidis* Rondani, by designation of Hendel 1914: 93). **New synonymy.**

Strobelia Rondani is here considered a subjective junior synonym of *Rachiptera* Bigot, and the following species, all of which were originally described in *Strobelia*, are transferred to *Rachiptera* as **new combinations**: *R. alboguttata* (Hendel 1914), *R. baccharidis* (Rondani 1868), *R. bimaculata* (Hendel 1914), *R. ferruginea* (Hendel 1928), *R. lutulenta* (Hendel 1914), *R. parallela* (Hendel 1914), and *R. rubiginosa* (Rondani 1868).

Rachiptera includes 11 described and various undescribed species from South America (Argentina, Bolivia, Chile, Colombia, Peru, southern Brazil) that form galls on species of *Baccharis*, *Grindelia*, and *Heterothalamus* (Asteraceae: Astereae). The genus is most closely related to *Paracantha* (see discussion under that genus). Most species form an unusual gall (Fig. 104) that is surrounded by a white spongy substance secreted by the larva giving it the superficial appearance of a ball of styrofoam (Aljaro *et al.* 1984, Frias 2008).

The species previously placed in *Rachiptera*, *R. biarcuata* Hendel, *R. limbata* Bigot, *R. percnoptera* Hendel, and *R. virginalis* Hering, along with an undescribed species from Peru and Colombia, probably form a monophyletic group. They share probable apomorphic character states including an elongate wing shape, with the posterior margin at least slightly convex and with a hyaline border (although very small in *R. virginalis*), and crossveins r-m and dm-cu at a sharp angle. These characters were used by Hendel (1914) and Foote (1980) to separate *Rachiptera* from *Strobelia*, but they, as well as the markings of the face and frons and the scutal setulae pattern, intergrade within *Strobelia*. *Rachiptera parallela* and specimens examined from Brazil that are similar to *R. virginalis* (or perhaps conspecific with it if wing shape and pattern in *R. virginalis* vary slightly) have elongate, parallel-sided wings without a hyaline area on the posterior margin. In both species the crossveins vary from subparallel to moderately angled. The wings of other species previously included in



FIGURES 102–106. 102, *Paracantha trinotata* (Mexico: Lago de Zempoala, USNMENT00213368), habitus, lateral; 103, *P. gentilis*, scutellum, dorsal (USA: Valles Caldera Preserve, USNMENT00654168); 104, *Rachiptera limbata* galls on *Baccharis rosmarinifolia* (Chile: Las Vertientes); 105, *Rachiptera parallela*, habitus, lateral (Bolivia: Colonia Luayza, USNMENT00055061); 106, gall on *Baccharis trinervis*.

Strobelia vary from slightly (*R. luculenta*) to broadly oval, with the crossvein orientation more or less correlated with wing shape. The scutal setulae pattern is damaged in many specimens examined, but varies from similar to that in most *Paracantha* species, with ovoid nonsetulose areas (in at least *R. parallela* and *R. alboguttata*), with more elongate nonsetulose areas (sp. nr. *virginalis*), to more evenly distributed (*R. biarcu-*

ata, *R. limbata*, and *R. percnoptera*). Finally, *R. parallela* forms a simple gall (see below), so the behavior of secreting the white material around the gall appears not to be a synapomorphy for all species and is not correlated with wing shape. Although *Rachiptera* in the sense of previous authors may be monophyletic, *Strobelia* is not, and there is no clearcut way to divide the entire clade, thus it is preferable to synonymize these names and recognize one genus.

***Rachiptera parallela* (Hendel), new combination**

Figs. 105–106

Strobelia parallela Hendel 1914: 51.

Distribution. This species has been known only from the type series, collected at Sarampiuni, Bolivia (La Paz, Mapiri area) at 700 m and Callanga, Peru. The locality in Bolivia is in the Yungas region, as is the locality where an additional male was reared.

Biology. One male was reared from a simple stem gall (Fig. 106) on *Baccharis trinervis* (Lam.) Pers.

Material examined. BOLIVIA: La Paz: NE of Santa Fe, Colonia Luayza, Entel (telephone) antenna, 15°46'35.2"S 67°35'48.1"W, 1900 m, emerged 28 Apr 2001 reared ex stem gall on *Baccharis trinervis* (01-Bol-23) collected 13 Apr 2001, A. L. Norrbom, 1♂ (USNM USNMENT00055061).

***Rhagoletis* Loew**

Rhagoletis Loew 1862 (type species *Musca cerasi* Linnaeus, by monotypy).

Stoneola Hering 1941 (type species *Anastrepha fuscobasalis* Hering, by original designation). **New synonymy.**

The monotypic genus *Stoneola* Hering is here considered a subjective junior synonym of *Rhagoletis* Loew, although it remains an available name if the large, somewhat heterogeneous genus *Rhagoletis* is eventually split.

The lectotype of *R. fuscobasalis* (Hering), from Chanchamyo, Peru, is similar to the *Rhagoletis ferruginea* group, which includes *R. adusta* Foote from southern Brazil, *R. blanchardi* Aczél from Argentina and Bolivia, and *R. ferruginea* Hendel from Argentina, southern Brazil, and Uruguay. The body of *R. fuscobasalis* is mostly yellow brown, dark brown only on the anepimeron, anatergite, and mediotergite, and the scutum has a 4-striped microtrichial pattern. The wing pattern (Fig. 93) is banded, similar to the *R. ferruginea* group (Fig. 95), except the entire pattern is fainter and more diffuse, with no accessory costal band present, and the subapical band is very broad, the hyaline area between it and the posterior apical band not reaching vein M, and the hyaline area between the anterior and posterior apical bands not reaching vein R₄₊₅. The absence of the accessory costal band may be due to the fact that the subapical band is extremely broad (fused with accessory costal band?). One difference in *R. fuscobasalis* is that the apex of the first flagellomere is rounded, but that character varies in some *Rhagoletis* species. The setae in the ventral row on the apical half of the fore femur in *R. fuscobasalis* (Fig. 107) are very stout, but those in the *R. ferruginea* group (Fig. 109) and an undescribed species from Argentina (Fig. 108) are stouter than in other *Rhagoletis* and are intermediate. This appears to be a synapomorphy for all five species. The undescribed species from Argentina (female specimens from CAS, USNM, IML; some determined by Foote as *Stoneola*), also is intermediate in wing pattern (Fig. 94). It is similar to *R. fuscobasalis* in color, but the subapical band is not as broad, and the accessory costal band is present, although sometimes connected to the subapical band in cell r₁. It should also be noted that the accessory costal band is absent in some of the other species groups of *Rhagoletis*. The undescribed species also has spherical spermathecae as in the *R. ferruginea* group. *Rhagoletis fuscobasalis* and the undescribed species from Argentina have the scutellum mostly orange, the same color as most of the scutum, slightly paler apically, but without a distinctly whiter area which is a synapomorphy for these two species. They appear to be somewhat derived species of the *R. ferruginea* group.

***Rhagoletis fuscobasalis* (Hering), new combination**

Figs. 93, 107

Anastrepha fuscobasalis Hering 1935: 226.

Stoneola fuscobasalis: Hering 1941: 141.

Type data. Hering described this species from two male syntypes from Chanchamayo, Peru collected by Hoffmanns. A male syntype (PAN) with the following labels is here designated lectotype of *Anastrepha fuscobasalis* to stabilize the usage of this name: PERU Chanchamayo Hoffmanns [gray green]; Type [orange]; *Anastrepha fuscobasalis* m. Type det. M. Hering 1935 ♂; Lectotype ♂ *Anastrepha fuscobasalis* Hering by Norrbom.

Distribution. Peru. The record from Argentina (Foote 1980) was probably based on specimens of an undescribed species similar to *R. fuscobasalis*.

***Rhynencina spilogaster* (Steyskal)**

Figs. 116–118

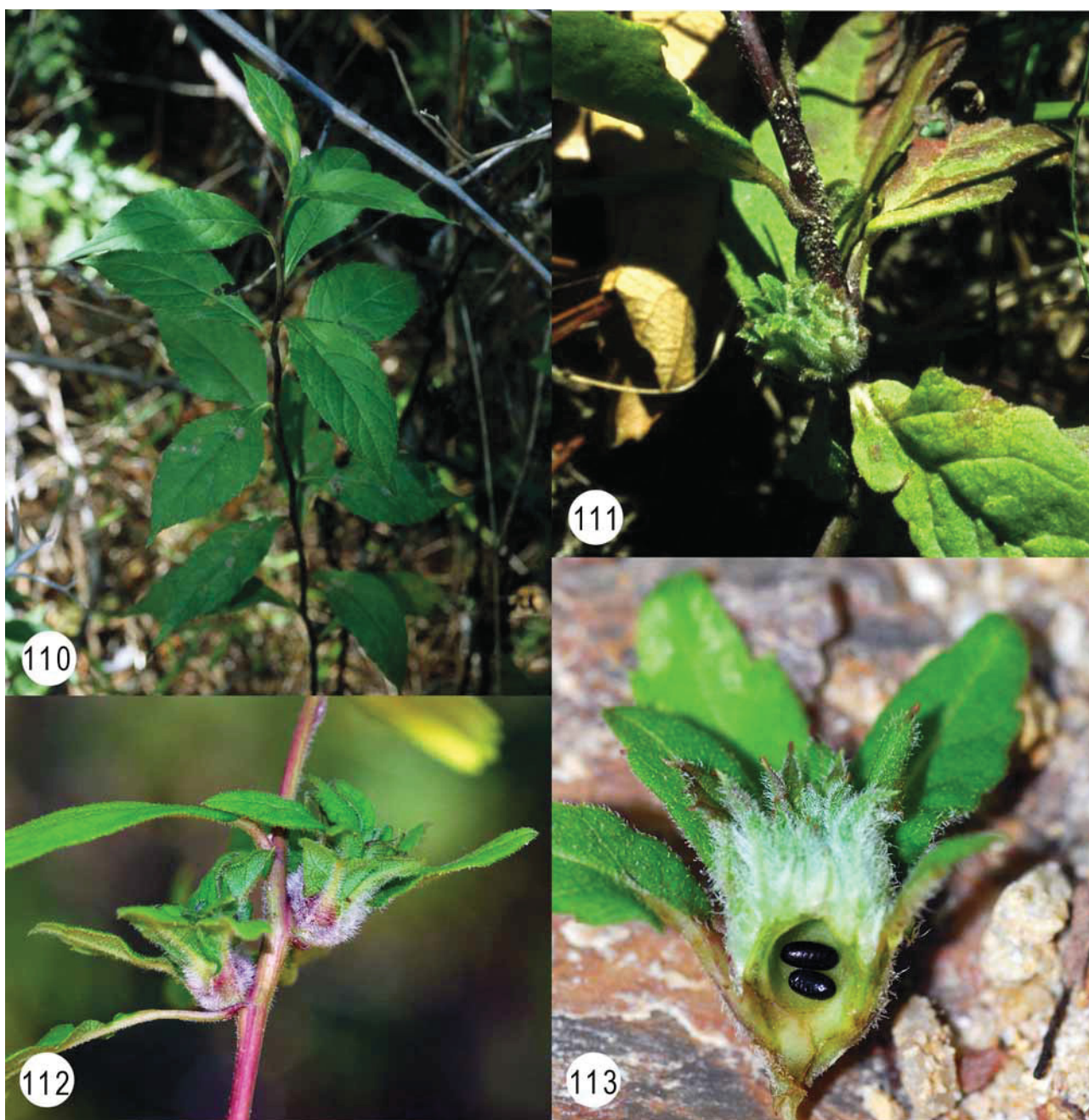
Distribution. Norrbom et al. (1999) reported the range of this species as “Mexico (Veracruz, Chiapas), Guatemala, Honduras”. Specimen data documenting these records are listed below.

Biology. Most of the examined specimens were collected on flowering *Smallanthus maculatus* (Cav.) H. Rob. (Fig. 114, 116–118) or *S. riparius* (H.B.K.) H. Rob., which are probable hosts, although this needs confirmation by rearing.

Material examined. GUATEMALA: Guatemala: near Santa Elena Barrillas, road to TV antennas, 14.40685°N 90.52991°W, 1917 m, on flowering *Smallanthus maculatus*, 22 Nov 2007, B.D. Sutton, A.L. Norrbom, G. J. Steck, J. Monzón, 1♂ (USNM USNMENT00671505). Huehuetenango: 9 km (air) NW of Cuilco, 15.44457°N 92.03561°W, 2111 m, on *Smallanthus maculatus*, 24 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, F. Camposeco, 2♀ (USNM USNMENT00671506–07). Jalapa: Jalapa - Mataquescuintla Road, 14.53732°N 90.17467°W, 1915 m, on flowering *Smallanthus maculatus*, 21 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 4♂ 2♀ (USNM USNMENT00104350–53, USNMENT00671503–04), 1♂ (UVG). Sacatepéquez: Cerro Carmona, Finca El Pilar, 14.53071°N 90.69018°W, 2265 m, on flowering *Smallanthus maculatus* (07G02), 12 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, 9♂ 8♀ (USNM USNMENT00671481–97), 1♂ 2♀ (UVG); San Miguel Dueñas, 3–6 km W of, collected on *Smallanthus maculatus* (90G10), 17 Oct 1990, A. L. Norrbom, 3♂ 4♀ (USNM USNMENT00104418–24); Volcán de Agua, trail from Ciudad Viejo, collected on *Smallanthus maculatus* (90G14), 19 Oct 1990, A. L. Norrbom, 4♂ 3♀ (USNM); Volcan de Agua, trail from Santa Maria de Jesus, collected on *Smallanthus maculatus* (90G14), 21 Oct 1990, A. L. Norrbom, 6♂ 4♀ (USNM); Volcán de Agua, trail from Santa Maria de Jesus, cultivated zone, 14.49255°N 90.71864°W, 2115 m, 13 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, 1♂ (USNM USNMENT00104356). HONDURAS: Francisco Morazán: Zamorano, Escuela Agrícola Panamericana, 12 Oct 1966, J. S. Packard, 1♂ (USU USNMENT00053818). MEXICO: Chiapas: between Chiquihuites & Union Juarez, ~15°05'N 92°05'W, 1500–1800 m, collected on *Smallanthus riparius*, 30 Oct 1993, A. L. Norrbom & C. Estrada, 2♂ (USNM); same, 4 Nov 1993, 4♂ 7♀ (USNM), 1♀ (IEXV); NW of Union Juarez, Chiquihuites, ~15°5'N 92°06'W, 1800–2000 m, collected on *Smallanthus maculatus* (94M3), 2–5 Nov 1994, A. L. Norrbom, L. E. Carroll & C. Estrada, 21♂ 11♀ (USNM), 3♂ 2♀ (IEXV); same, 14–18 Nov 1994, L. E. Carroll & C. Estrada, 4♂ 2♀ (IEXV), 17♂ 5♀ (USNM); Mnpo. Cacahoatan, Ejido Santa Maria La Vega, ~14°59'N 90°10'W, collected on *Smallanthus maculatus* (93M14), 2 Nov 1993, A. L. Norrbom & C. Estrada, 1♂ 2♀ (USNM USNMENT00213171–73); El Bosque, 23 Jul 1969, L. A. Kelton, 1♀ (CNC); San Cristobal de Las Casas, 27 Jul 1969, D. Kritsch, 1♂ (CNC); San Cristobal de Las Casas, 10 mi. W, 16 Aug 1972, G. F. & S. Hevel, 1♀ paratype (USNM USNMENT00054783); 20 mi N Bochil, Yerba Buena, 5800 ft., Malaise trap, 18 Jun 1969, B. V. Peterson, 1♀ (CNC). Veracruz: Córdoba, 4 Sep 1974, W. Hanson & G. Bohart, 1♀ (USU USNMENT00053656).



FIGURES 107–109. 107, *Rhagoletis fuscobasalis* (lectotype), male left foreleg, posterior view; 108, *Rhagoletis* sp. nr. *fuscobasalis* (Argentina: Rodeo, USNMENT00213082), female left foreleg, posterior view; 109, *R. ferruginea* (Brazil: Nova Teutonia, USNMENT00214278), male left foreleg, posterior view.



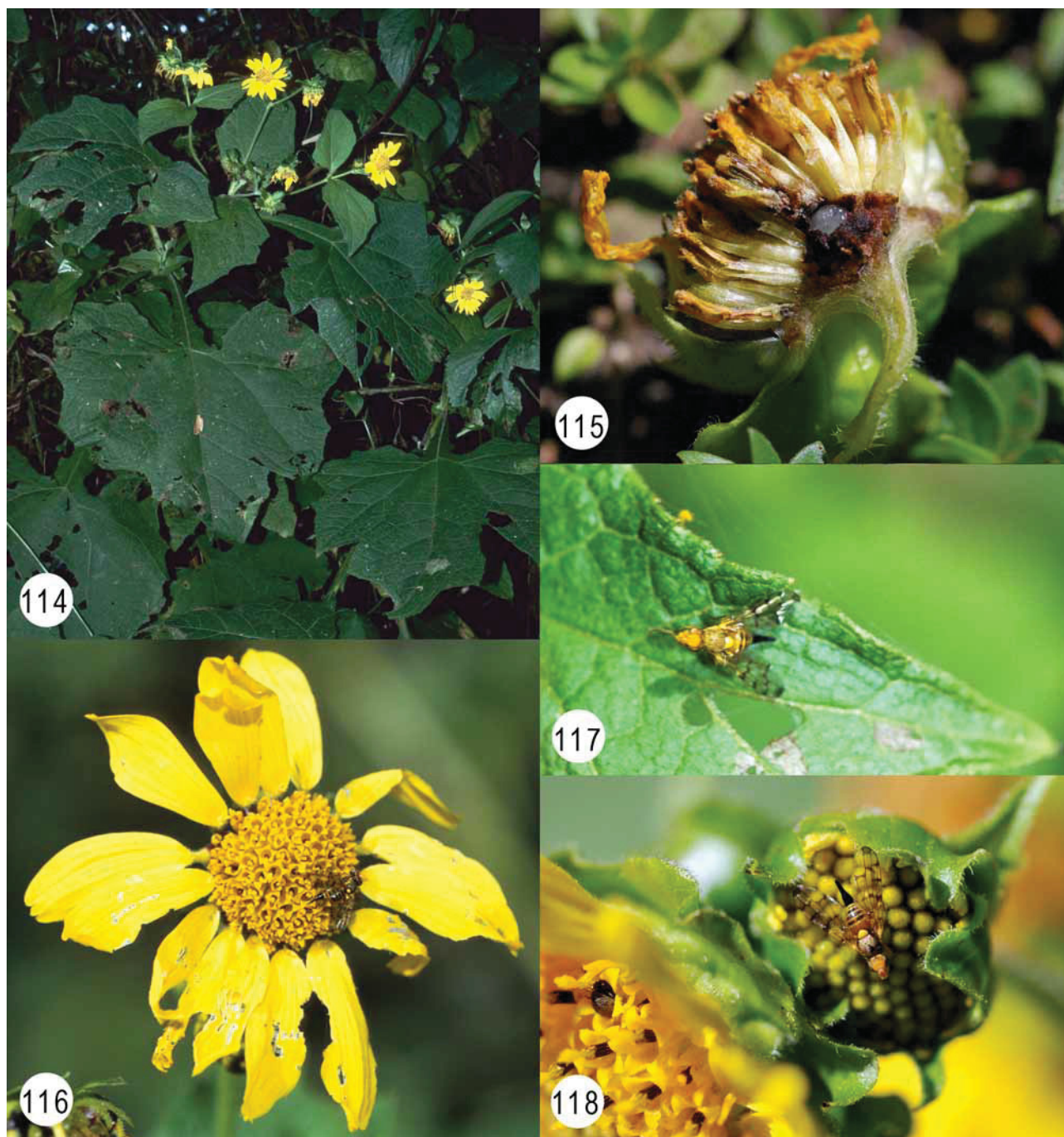
FIGURES 110–113. Host plants: *Archibaccharis asperifolia*, host of *Procecidochares suttoni*: 110, whole plant; 111–112, leafy galls; 113, opened gall with pupae.

Stenopa Loew

Stenopa Loew 1873: 234 (type species *Trypeta vulnerata* Loew, by monotypy).

Stenopa resembles *Dracontomyia* in wing pattern, scutellum shape, and thoracic chaetotaxy and microtrichial patterns (see discussion of *Dracontomyia*). It differs in having the scutellum entirely sparsely microtrichose (not bare medially), the costa with enlarged marginal setulae at the humeral break (Fig. 96), and the wing with 2 hyaline bands originating on the anterior margin in cell r_1 . The latter two characters are synapomorphies of *Stenopa*. The two previously known species develop in the root crowns of species of *Senecio* (Novak & Foote 1975, Goeden & Headrick 1990).

Diagnosis. Scutellum strongly convex, entirely sparsely microtrichose. Wing (Fig. 96) with 6 dark brown bands; basal 2 bands broadly connected anteriorly, separated by hyaline band extending from posterior margin and including apex of vein A_1+Cu_2 and extending anteriorly into cell dm , but not cell bm ; second and third bands connected to form Y-shaped mark with crossvein $r-m$ at their junction; second through fourth bands separated by 2 hyaline bands originating on anterior margin in cell r_1 ; apical 3 bands connected to form somewhat F-shaped mark. Costa with enlarged marginal setae at humeral break as well as subcostal break.



FIGURES 114–118. Host plants: *Smallanthus maculatus*, host of *Dictyotrypeta incisa* and probable host of *Rhynencina spilogaster*: 114, whole plant; 115, split capitulum with *D. incisa* larva; 116, pair of *R. spilogaster* in copula on flower-head; 117, female fly on leaf; 118, female fly on flowerhead.

Key to species of *Stenopa*

1. Wing (Fig. 96) with brown marginal spot on anal lobe isolated by inverted C-shaped hyaline mark; scutum with pair of clusters of yellow, lanceolate setulae on posterior margin anterior to corners of scutellum; scutellum with cluster of yellow, lanceolate setulae proximal to basal seta; lateral vertical seta brown, almost as dark as medial vertical seta and distinctly darker than postocellar seta. Central Mexico *mexicana* Norrbom, n. sp.
 - Wing with anal lobe mostly brown, with isolated marginal hyaline spot; other characters variable 2
2. Wing (Foote et al. 1993, fig. 402) with marginal hyaline spot on anal lobe large, extending to anterobasal corner of lobe; scutum with pair of clusters of 2–6 yellow, lanceolate setulae on posterior margin anterior to corners of scutellum; scutellum with cluster of yellow, lanceolate setulae (rarely only 1–2 setulae) proximal to basal seta; lateral vertical seta whitish, similar in color to postocellar seta, distinctly paler than brown medial vertical seta; USA (mountain states, Washington & Idaho to Arizona & Colorado) *affinis* Quisenberry
 - Wing (Foote et al. 1993, fig. 401) with marginal hyaline spot on anal lobe small, not extending to anterobasal corner of lobe; scutum without clusters of yellow, lanceolate setulae on posterior margin anterior to corners of scutellum; scutellum usually nonsetulose, occasionally with 1–2 yellow, lanceolate setulae proximal to basal seta; lateral vertical seta brown, often as dark as medial vertical seta, occasionally pale brown to yellow, but at least slightly darker than postocellar seta; widespread USA & southern Canada *vulnerata* (Loew)

Stenopa affinis Quisenberry

Stenopa affinis Quisenberry 1949: 87.

Diagnosis. Lateral vertical seta whitish to yellow, similar in color to postocellar seta; scutum with cluster of 2–6 yellow setulae on posterior margin anterior to corner of scutellum; scutellum with cluster of 1–12 yellow setulae proximal to basal seta; anal lobe with relatively large hyaline area extending to anterobasal corner.

Distribution. USA (Washington, Idaho, Oregon, Nevada, Colorado, northern Arizona). The records from Idaho and Washington slightly extend the known range northward.

Material examined. UNITED STATES: Arizona: Apache Co., Big Lake, 16 mi. S of, 4 Sep 1973, T. P. Sluss, 1♂ (UAT), 1♂ (USNM USNMENT00054101). Colorado: Rocky Mountain National Park, 7000 ft., Aug 1955, H. D. Stalker, 1♀ (USNM USNMENT00214279); Larimer Co., Pingree Park, 22 Aug 1925, H. H. Knight, 1♂ (USNM USNMENT00214387). Idaho: Idaho Co., Lolo Pass, 3 mi. E of, 26 Jul 1966, J. Novak, 2♂ (USNM USNMENT00054707–08). Washington: Yakima Co., Chinook Pass, 10 mi. E of, 31 Jul 1976, N. E. Woodley, 1♂ (USNM USNMENT00214252).

Stenopa mexicana Norrbom, new species

Fig. 96

Cecidocharella sp.: Foote 1980: 68, fig. 42.

Diagnosis. This species differs from *S. affinis* in having the lateral vertical seta brown, and from *S. vulnerata* in having clusters of setulae on the posterior margin of the scutum and on the scutellum, and from both species in the markings on the anal lobe, which has an isolated brown marginal spot.

Description. Mesonotum length 2.3 mm. Wing length 5.75 mm, width 2.60 mm, ratio 2.21. Head: Yellow to orange, entirely microtrichose, densely bright white microtrichose on lateral margin of face, facial ridge, parafacial, lateral margin of frons, and postgena. Face and frons medially orange, ocellar tubercle brown, most of occiput mottled orange brown, most of gena orange brown. Parafacial without brown spot. Frons anteromedially with numerous yellow slender setulae; 3 frontal setae, all brown; 2 orbital setae, both acuminate, anterior seta brown, posterior seta pale brown; ocellar and medial vertical seta well developed, brown; lateral vertical seta acuminate, brown, ca. 2/5 as long as medial vertical seta; postocellar and paraverticlar setae yellow, lanceolate; postocular setae mixed small, pale brown, acuminate and larger, yellow, lanceolate; genal seta brown; postgenal setulae numerous, large, yellow, acuminate.

Thorax: Mostly mottled reddish brown, scutellum, subscutellum and mediotergite darker brown; scutum entirely grayish to tan microtrichose. Scutellum very strongly convex, entirely sparsely microtrichose, microtrichia mostly grayish but dark brown narrowly along base medially; subscutellum entirely densely dark brown microtrichose; mediotergite shiny, nonmicrotrichose on medial half, sparsely gray microtrichose narrowly on dorsal margin and more broadly laterally, broadening ventrally; pleuron entirely microtrichose including anepisternum and katepisternum.

Thoracic setae long, dark brown, and acuminate, including postpronotal, 2 notopleural, presutural and postsutural supra-alar, dorsocentral, acrostichal, intra-alar, postalar, 2 scutellar, 2 anepisternal, katepisternal, and anepimeral. Posterior notopleural seta ca. 3/5 as long as anterior notopleural. Dorsocentral seta aligned slightly closer to transverse suture than level of postsutural supra-alar seta. Scutal setulae yellow, lanceolate, more or less evenly distributed in irregular rows, with loose cluster of 5–6 setulae on posterior margin anterior to corner of scutellum. Scutellum with loose cluster of 8–9 yellow, lanceolate setulae proximal to basal seta.

Wing (Fig. 96): Costa with 2 setae at humeral break and 3 setae at subcostal break 2–3 times as large as other costal setulae. Pterostigma short, 0.36 times as long as cell c, subrectangular; vein R_1 strongly curved subapically. Vein R_{2+3} relatively straight, area surrounding it proximal to level of apex of R_1 concave but not distinct bulla; relatively long, ending considerably distal to level of dm-cu, distance between apices of R_1 and R_{2+3} / distance between apices of R_{2+3} and R_{4+5} : 2.70. Vein R_{4+5} slightly curved and vein M nearly straight distal to dm-cu so that cell r_{4+5} is slightly broader medially than at apex; cell r_{4+5} without bulla anterior to dm-cu. Crossvein dm-cu length/ width of radial cells measured directly anterior to it: 0.63. Wing pattern with 2 marginal hyaline areas in cell r_1 , proximal mark extending to vein M, distal mark extending almost to vein Cu_1 ; cell cu_1 with 1 marginal hyaline mark, including apex of vein A_1+Cu_2 , extending anteriorly into basal part of cell dm, almost reaching vein M; crossvein r-m 0.50 distance from bm-cu to dm-cu, within proximal hyaline mark extending from cell r_1 . Anal lobe with large marginal brown spot isolated by inverted-C shaped hyaline area of similar width. Anterior apical band separated from costa by extremely narrow hyaline area in cells r_1 and r_{2+3} , slightly broader at apex of vein R_{2+3} . Cell m with proximal hyaline mark well separated from dm-cu, extending anteriorly slightly beyond vein M; distal hyaline mark extending anteriorly to slightly beyond vein R_{4+5} .

Type data. Holotype ♂ (AMNH), MEXICO: Paso de Cortes, 16 Feb 1947, W. G. Downs. The abdomen of the holotype is missing, but the wing slide has a male symbol. The type locality is on the México/Puebla border, approximately 19°5'N 98°38'W.

Distribution. Central Mexico.

Etymology. The epithet is an adjective based on the country of origin of the holotype.

Stenopa vulnerata (Loew)

Trypeta vulnerata Loew 1873: 232.

Diagnosis. Lateral vertical seta usually brown (yellow or pale brown in 3 of 35 specimens examined); scutum without cluster of yellow setulae on posterior margin; scutellum usually nonsetulose, occasionally (3 of 35 specimens examined) with 1–2 yellow setulae proximal to basal seta on at least one side; anal lobe with small, relatively posterior hyaline spot well separated from anterobasal corner.

Distribution. Canada (Alberta, British Columbia, Manitoba, Saskatchewan, Ontario, Quebec) and United States (Arizona, California, Colorado, Connecticut, northern Georgia, Idaho, Maryland, Massachusetts, Michigan, Montana, New Hampshire, New Mexico, New York, western North Carolina, Ohio, Oregon, Pennsylvania, eastern Tennessee, Texas, Vermont, Virginia, Wyoming). In the United States, it has not been reported from the Plains states, the Midwest except Michigan and Ohio, and south of Virginia except in the Appalachian Mountains.

Material examined. CANADA: Alberta: Banff, Loop, 4500 ft., 23 Jul 1925, O. Bryant, 2♂ 1♀ (USNM USNMENT00214345–47); Banff, Buffalo Pk., 4500 ft., 5 Aug 1925, O. Bryant, 2♂ 2♀ (USNM

USNMENT00214382–85; Banff, Vermillion Lake, 4500 ft., 20 Aug 1925, O. Bryant, 1♂ 1 without abdomen (USNM USNMENT00214270–71); High River, 25 Aug 1928, 1♂ (USNM USNMENT00214265); Morley, 15 mi. E of, 14 Aug 1962, K. C. Hermann, 1♀ (USNM USNMENT00214273); same, W. R. Mason, 1♂ (CNC USNMENT00214272); Slave Lake, 17 Aug 1924, O. Bryant, 1♂ (USNM USNMENT00214352). Ontario: Waterloo area, Elmira Spring, 43°38'46"N 80°30'29"W, 28 July 2006, S. A. Marshall, 1♂ (DEBUG). UNITED STATES: Connecticut: Falls Village, 29 Sep 1952, A. Stone, 1♀ (USNM USNMENT00054077); South Kent, 21 Aug 1894, 1♂ (USNM USNMENT00054631). Georgia: Yonah Mt., 10 Jun 1936, P. W. Fattig, 1 without abdomen (USNM USNMENT00054424). Maryland: Baltimore Co., 3 km N Deer Park, Soldiers Delight, 29 Oct 1986, W. E. Steiner, J. M. Swearingen, J. M. Hill, 1♀ (USNM USNMENT00214268); Montgomery Co., Plummers Island, 24 Aug 1907, W. L. McAtee, 1♀ (USNM USNMENT00470066); same, 12 Jul 1914, L. O. Jackson, 1♀ (USNM USNMENT00470067); same, 5 Aug 1914, R. C. Shannon, 1♂ (USNM USNMENT00470068); same, 6 Aug 1915, R. C. Shannon, 1♂ (USNM USNMENT00470069). Michigan: Emmet Co., unspecified locality, 2 Aug 1934, 1♂ (USNM USNMENT00214388). New Hampshire: Franconia, 29 Jul 1915, C.H.T. Townsend, 1♀ (USNM USNMENT00214344). New Mexico: Sandoval Co., Jemez Mountains, Aug 1909, 1♀ (USNM USNMENT00214267). North Carolina: Transylvania Co., Toxaway Mountain, 3000–4000 ft., 1♀ (USNM USNMENT00104328). Pennsylvania: Huntington Co., Stone Valley Recreation Area, 27 Jul 1976, F. D. Fee, 1♀ (USNM USNMENT00214389). Tennessee: Coal Creek, 12 Jul 1916, W.S. Adkins, 1♀ (USNM USNMENT00214396); same, 24 Jul 1916, 1♀ (USNM USNMENT00214393); Sevier Co., Great Smoky Mts. Natl. Park, Sugarlands Headquarters, 15 Jun 1946, G. C. Steyskal, 1♀ (USNM USNMENT00214398). Texas: unspecified locality, Belfrage, 1♂ (USNM USNMENT00214269). Wyoming: Uinta Co., Lonetree, 17 Jul 1940, G. F. Knowlton & F. C. Harmston, 1♂ (USNM USNMENT00214259).

Tomoplagia stonei Aczél

Distribution. Previously known only from Panama. The records below from Guatemala and northeastern Mexico considerably extend the known distribution.

Biology. No host plants have been reported previously for this species. We reared it in Guatemala from flowerheads of *Lycoseris crocata* (Bertol.) S.F. Blake (Asteraceae: Mutisieae) (Figs. 119–122). *Tomoplagia* species attack plants in a variety of Asteraceae tribes, but some other species have been reared from Mutisieae (Prado et al. 2002).

Material examined. GUATEMALA: Zacapa: Santa Cruz - San Lorenzo Road, irrigation ditch, 15.03447°N 89.67704°W, 274 m, thorn scrub, emerged 18 Nov–10 Dec 2007 reared ex flowerheads of *Lycoseris crocata* (07G18) collected 15 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 19 (FSCA), 8♂ 14♀ (USNM USNMENT00671368–90), 1♂ 2♀ (UVG). MEXICO: Tamaulipas: Hidalgo, Pan Am Hwy., 18 May 1956, CA- 177, #56-8986, 1♂ (USNM USNMENT00051079). PANAMA: Panamá: Perlas Islas, El Rey, 13 Apr 1981, R.W. Brooks, 1♀ (USU USNMENT00051078).

Trupanea pseudovicina Hering

Distribution. The record below from Guatemala is a considerable extension of the previously known distribution of this species, United States (Arizona, California, Colorado, Kansas, New Mexico, Oklahoma, Texas), which was mapped by Foote et al. (1993).

Biology. The only previously reported host plants for *T. pseudovicina* are *Bebbia juncea* (Benth.) Greene (Wasbauer 1972), considered an erroneous record by Goeden & Teerink (1998), and *Porophyllum gracile* Benth. (Wasbauer 1972, Goeden & Teerink 1998). We reared it from *Porophyllum ruderae* (Jacq.) Cass. (Asteraceae: Tageteae) (Figs. 123–125) in Guatemala. The larvae develop in the flowerhead.

Material examined. GUATEMALA: Zacapa: Santa Cruz - San Lorenzo Road, thorn scrub - oak forest transition, 15.04702°N 89.66871°W, 626 m, emerged 28 Nov–9 Dec 2007 reared ex flowerheads of *Porophyl-*

lum rudera (07G19) collected 15 Nov 2007, B.D. Sutton, G.J. Steck, A.L. Norrbom, J. Monzón, 2♂ 1♀ (FSCA), 3♂ 4♀ (USNM USNM00671395-402), 1♂ 1♀ (UVG).



FIGURES 119–122. Host plants: *Lycoseris crocata*, host of *Tomoplagia stonei*: 119, inflorescence; 120–121, capitulum; 122, opened capitulum with larval feeding damage.

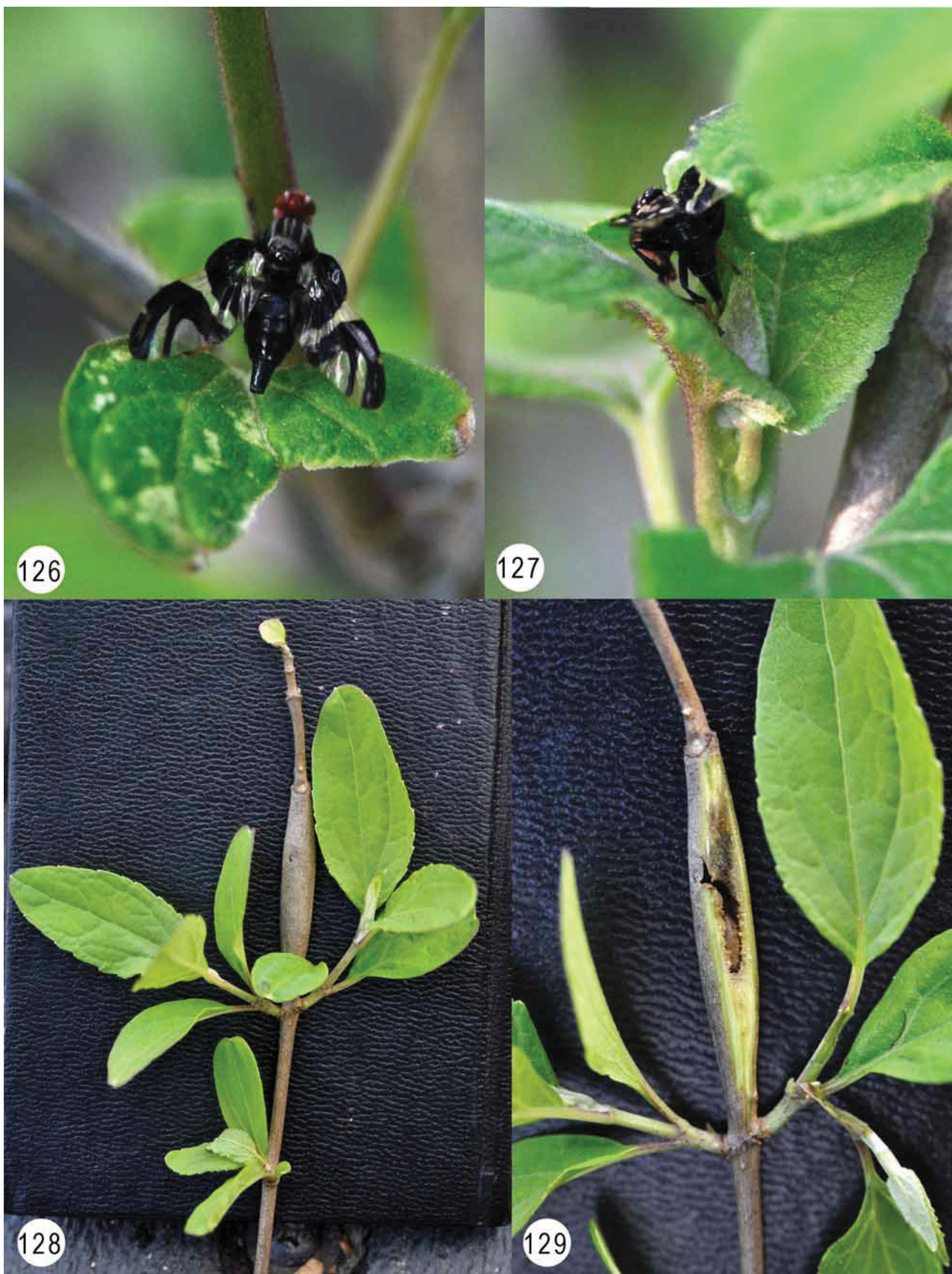
Xanthaciura insecta (Loew)

Remarks. The examined series from Venezuela has the subbasal hyaline mark in cell cu_1 more elongate than in other specimens examined.

Biology. Ten species, including seven species of *Bidens*, have been previously reported as host plants for *X. insecta*. The records below include a new host record from *Cosmos sulphureus* Cav. and data documenting the records of *Bidens squarrosa* H.B.K. and *Dahlia coccinea* Cav. reported by Foote et al. (1993). *Bidens*, *Cosmos*, and *Dahlia* are closely related genera, all belonging to the tribe Coreopsideae of the Asteraceae. The larvae develop in the flowerheads.



FIGURES 123–125. Host plants: *Porophyllum ruderale*, host of *Trupanea pseudovicina*: 123, inflorescence; 124–125, capitula.



FIGURES 126–129. Undetermined probable host plant of *Ostracocoelia mirabilis*, possibly *Ageratina* sp.: 126, female on foliage; 127, female in oviposition; 128, old stem gall; 129, opened gall showing empty puparium.

Material examined. GUATEMALA: Huehuetenango: Huehuetenango - Cuilco Road (7W), E of Chejoj, 15.41126°N 91.8241°W, 1717 m, emerged 3–5 Dec 2007 reared ex flowerheads of *Cosmos sulphureus* (07G63) collected 24 Nov 2007, B.D. Sutton, A.L. Norrbom, J. Monzón, F. Camposeco, 1♂ 1♀ (USNM USNMENT00671457–58). Sacatepéquez: Volcán de Agua, trail from Ciudad Viejo, reared ex flowers of *Dahlia coccinea* Cav. (90G11), 19 Oct 1990, A. L. Norrbom, 42♂ 29♀ (USNM), 3♂ 2♀ (FSCA), 4♂ 2♀ (UVG). MEXICO: Chiapas: Rt. 190 between Belem & Teopisca, 1800 m, reared ex flowerheads of *Dahlia coccinea* Cav. (87M15), 20 Sep 1987, A. L. Norrbom & L. E. Carroll, 1♂ 1♀ (IEXV), 2♂ 3♀ (USNM USNMENT00214399–403); Rt. 195 btw. Bochil & Soyalo, 1550 m, reared ex flowerheads of *Dahlia coccinea* Cav. (87M9), 19 Sep 1987, A. L. Norrbom, 1♂ 1♀ (IEXV), 2♂ 1♀ (USNM USNMENT00104384–86), Cacahoatan, Centro Exp. Rosario Izapa, 14°59'N 90°10'W, reared ex flowerheads of *Bidens alba* L. (93M13), 2 Nov 1993, A. L. Norrbom & C. Estrada, 3♂ 1♀ (USNM USNMENT00214348–51). VENEZUELA: Mérida: Páramo La Culata, reared ex flowerheads of *Bidens squarrosa* H.B.K. (89V16), 27 Oct 1989, A. L. Norrbom, 1♂ 2♀ (IZAM), 3♂ 6♀ (USNM USNMENT00104391–400).

Acknowledgments

We sincerely thank Harold Robinson and Steve Smith (Department of Botany, Smithsonian Institution) for identifying host plants and providing information on their classification. Marie Metz, Taina Litwak, and Lucrecia Rodriguez produced some of the illustrations. We thank Nate Erwin who kindly permitted Norrbom to use the quarantine area at the USNM Orkin Insect Zoo for emergence of most of the reared exotic specimens, and APHIS PPQ staff for help in arranging permits for this purpose. Our thanks also go to the Comisión Nacional de Áreas Protegidas (CONAP) for permits in Guatemala, Defensores de la Naturaleza for permission to collect in the Sierra de las Minas Biosphere Reserve, and the Universidad del Valle de Guatemala Systematic Entomology Laboratory and Arthropod Collection, particularly Jack Schuster and Enio Cano, for their kind advice and assistance in Guatemala. Amnon Freidberg (Tel Aviv University) and Alex Konstantinov and Norm Woodley (SEL) reviewed versions of the manuscript.

References

- Aczél, M.L. (1950) Catalogo de la familia 'Trypetidae' (Dipt. Acalypt.) de la region neotropical. *Acta Zoologica Lilloana* (1949), 7, 177–328.
- Aczél, M.L. (1953) La familia Tephritidae en la region neotropical. I. *Acta Zoologica Lilloana*, 13, 97–200.
- Aljaro, M.E., Frias, D. & Montenegro, G. (1984) Life cycle of *Rhachiptera limbata* (Diptera, Tephritidae) and its relationship with *Baccharis linearis* (Compositae). *Revista Chilena de Historia Natural*, 57, 123–129.
- Benjamin, F.H. (1934) Descriptions of some native trypetid flies with notes on their habits. *United States Department of Agriculture Technical Bulletin*, 401, 95 pp.
- Bush, G.L. & Huettel, M.D. (1970) Cytogenetics and description of a new North American species of the Neotropical genus *Cecidocharella* (Diptera: Tephritidae). *Annals of the Entomological Society of America*, 63, 88–91.
- Cavender, G.L. & Goeden, R.D. (1984) The life history of *Paracantha cultaris* (Coquillett) on wild sunflower, *Helianthus annuus* L. ssp. *lenticularis* (Douglas) Cockerell, in southern California (Diptera: Tephritidae). *Pan-Pacific Entomologist*, 60, 213–218.
- Curran, C.H. (1934) The Templeton Crocker Expedition of California Academy of Sciences, 1932. No. 13. Diptera. *Proceedings of the California Academy of Sciences*, 21, 147–172.
- Doane, R.W. (1899) Notes on Trypetidae with descriptions of new species. *Journal of the New York Entomological Society*, 7, 177–193.
- Foote, R.H. (1958) The genus *Euaestoides* in the United States and Mexico (Diptera, Tephritidae). *Annals of the Entomological Society of America*, 51, 288–293.
- Foote, R.H. (1965) A study of the types of Tephritidae described by F. M. van der Wulp in 'Biologia Centrali-Americana' (Diptera). *Journal of the Kansas Entomological Society*, 38, 236–247.
- Foote, R.H. (1967) Family Tephritidae (Trypetidae, Trupaneidae). In: Papavero, N. (Ed.), *A catalogue of the Diptera of the Americas south of the United States*. Departamento de Zoologia, Secretaria da Agricultura, São Paulo. Fascicle 57, 91 pp.

- Foote, R.H. (1978) New genera and species of neotropical Tephritidae (Diptera). *Journal of the Washington Academy of Science*, 68, 27–32.
- Foote, R.H. (1980) Fruit fly genera south of the United States (Diptera: Tephritidae). *United States Department of Agriculture Technical Bulletin*, No. 1600, IV + 79 pp.
- Foote, R.H., Blanc, F.L. & Norrbom, A.L. (1993) *Handbook of the fruit flies (Diptera: Tephritidae) of America north of Mexico*. Comstock Publishing Associates, Ithaca. xii + 571 p.
- Freidberg, A. (1985) The genus *Craspedoxantha* Bezzi (Diptera: Tephritidae: Terebrinae). *Annals of the Natal Museum*, 27, 183–206.
- Freidberg, A. (2002) Systematics of Schistopterini (Diptera: Tephritidae: Tephritinae), with descriptions of new genera and species. *Systematic Entomology*, 27, 1–29.
- Frías, D. (1992) Aspectos de la biología evolutiva de especies de Tephritidae (Diptera) de distribución chilena. *Acta Entomologica Chilena*, 17, 69–79.
- Frías, D. (2008) Morphology of immature stages in the Neotropical nonfrugivorous Tephritinae fruit fly species *Rachiptera limbata* Bigot (Diptera: Tephritidae) on *Baccharis linearis* (R. et Pav.) (Asteraceae). *Neotropical Entomology*, 37, 536–545.
- Goeden, R.D. & Norrbom, A.L. (2001) Life history and description of adults and immature stages of *Procecidochares blanci*, n. sp. (Diptera: Tephritidae) on *Isocoma acradenia* (E. Greene) E. Greene (Asteraceae) in southern California. *Proceedings of the Entomological Society of Washington*, 103, 517–540.
- Goeden, R.D. & Headrick, D.H. (1990) Notes on the biology and immature stages of *Stenopa affinis* Quisenberry (Diptera: Tephritidae). *Proceedings of the Entomological Society of Washington*, 92, 641–648.
- Goeden, R.D. & Teerink, J.A. (1997) Life history and description of immature stages of *Xenochaeta dichromata* Snow (Diptera: Tephritidae) on *Hieracium albidiflorum* Hooker in central and southern California. *Proceedings of the Entomological Society of Washington*, 99, 597–607.
- Goeden, R.D. & Teerink, J.A. (1998) Life history and description of immature stages of *Trupanea pseudovicina* Hering (Diptera: Tephritidae) on *Porophyllum gracile* Benth in southern California. *Proceedings of the Entomological Society of Washington*, 100, 361–372.
- Han, H.-Y., Ro, K.-E. & McPherson, B.A. (2006) Molecular phylogeny of the subfamily Tephritinae (Diptera: Tephritidae) based on mitochondrial 16S rDNA sequences. *Molecules and Cells*, 22, 78–88.
- Hardy, D.E. (1968) The fruit fly types in the Naturhistorisches Museum, Wien. *Annalen des Naturhistorischen Museums in Wien*, 72, 107–155.
- Headrick, D. & Goeden, R.D. (1990) Description of the immature stages of *Paracantha gentilis* (Diptera: Tephritidae). *Annals of the Entomological Society of America*, 83, 220–229.
- Hendel, F. (1914) Die Bohrfliegen Südamerikas. Übersicht und Katalog der bisher aus der neotropischen Region beschriebenen Tephritinen. *Abhandlungen und Berichte des Königlichen Zoologischen und Anthropologisch-Ethnographischen Museums zu Dresden* (1912), 14 (3): 1–84.
- Hendel, F. (1936) Ergebnisse einer zoologischen Sammelreise nach Brasilien, insbesondere in das Amazonasgebiet, ausgeführt von Dr. H. Zerny. X Teil. Diptera: Muscidae Acalyptratae (excl. Chloropidae). *Annalen des Naturhistorischen Museums in Wien*, 47, 61–106.
- Hering, E.M. (1941) Trypetidae (Dipt.), p. 121–176, 1 pl. In: Titschack, E., *Beiträge zur Fauna Perus*. Band 1. Hamburg.
- Korneyev, V.A. (1999) Phylogeny of the subfamily Tephritinae: Relationships of the tribes and subtribes. In: Aluja, M. & Norrbom, A.L. (Eds.), *Fruit flies (Tephritidae): Phylogeny and evolution of behavior*. [16] + 944 pp., CRC Press, Boca Raton., pp. 549–580.
- Malloch, J.R. (1933) Fascicle 4.—Acalyptrata [part]. In: *Diptera of Patagonia and South Chile*. Pt. 6. British Museum (Natural History), London, pp. 177–391, pls. 2–7.
- Malloch, J.R. (1941) The American genus *Paracantha* Coquillett (Diptera, Trypetidae). *Revista de Entomologia (Rio de Janeiro)*, 12, 32–42.
- Norrbom, A.L., Carroll, L.E., Thompson, F.C., White, I.M. & Freidberg, A. (1999) Systematic database of names. In: Thompson, F. C. (Ed.), *Fruit Fly Expert Identification System and Systematic Information Database*. *Myia* (1998), 9, pp. 65–251, & *Diptera Data Dissemination Disk* (CD-ROM) (1998) 1.
- Novak, J.A. & Foote, B.A. (1975) Biology and immature stages of fruit flies: the genus *Stenopa* (Diptera, Tephritidae). *Journal of the Kansas Entomological Society*, 48, 42–52.
- Prado, P.I., Lewinsohn, T.M., Almeida, A.M., Norrbom, A.L., Buys, B.D., Macedo, A.C. & Lopes, M.B. (2002) The fauna of Tephritidae (Diptera) from capitula of Asteraceae in Brazil. *Proceedings of the Entomological Society of Washington*, 104, 1007–1028.
- Sutton, B.D. & Steck, G.J. (2005) An annotated checklist of the Tephritidae (Diptera) of Florida. *Insecta Mundi*, 19, 227–245.
- Sutton, B.D., Steck, G.J. & Defoe, D. (2003) New records for Tephritidae (Diptera) from Great Smoky Mountains National Park - II. *Insecta Mundi* (2002), 16, 1–8.
- Steyskal, G.C. (1970) *Ensina sonchi* (Linnaeus) in South America (Diptera: Tephritidae). *Journal of the Washington*

Academy of Science, 60, 158–159.

- Tauber, M.J. & Tauber, C.A. (1967) Reproductive behavior and biology of the gall-former *Aciurina ferruginea* (Doane) (Diptera: Tephritidae). *Canadian Journal of Zoology* 45, 907–913.
- Wasbauer, M.S. (1972) An annotated host catalog of the fruit flies of America north of Mexico (Diptera: Tephritidae). *Occasional Papers, California Department of Agriculture, Bureau of Entomology*, 19, [i] + 172 p.
- White, I.M. & Marquardt, K. (1989) A revision of the genus *Chaetorellia* Hendel (Diptera: Tephritidae) including a new species associated with spotted knapweed, *Centaurea maculosa* Lam. (Asteraceae). *Bulletin of Entomological Research*, 79, 453–487.
- White, I.M., Norrbom, A.L., Headrick, D.H. & Carroll, L.E. (1999) Glossary. In: Aluja, M. & Norrbom, A. L. (Eds.), *Fruit flies (Tephritidae): Phylogeny and evolution of behavior*. [16] + 944 pp., CRC Press, Boca Raton, pp. 881–924.
- Wulp, F.M. van der (1899a) Fam. Muscidae. In: Godman, F. D. & Salvin, O. (Eds.), *Biologia Centrali-Americana. Zoologia. Class Insecta. Diptera. Or, contributions to the knowledge of the fauna and flora of Mexico and Central America*. Vol. 2. Taylor & Francis, London, pp. 393–408.
- Wulp, F.M. van der (1899b) Fam. Muscidae. In: Godman, F. D. & Salvin, O. (Eds.), *Biologia Centrali-Americana. Zoologia. Class Insecta. Diptera. Or, contributions to the knowledge of the fauna and flora of Mexico and Central America*. Vol. 2. Taylor & Francis, London, pp. 409–416.
- Wulp, F.M. van der (1900) Fam. Muscidae. In: Godman, F. D. & Salvin, O. (Eds.), *Biologia Centrali-Americana. Zoologia. Class Insecta. Diptera. Or, contributions to the knowledge of the fauna and flora of Mexico and Central America*. Vol. 2. Taylor & Francis, London, pp. 417–428.